DRAFT
ENVIRONMENTAL IMPACT STATEMENT

Office of Ocean and Coastal Resource Management's Review of Amendments to the Alaska Coastal Management Program

Volume I

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
PROGRAM PLANNING AND INTEGRATION
Silver Spring, Maryland 20910

SEP 16 2005

Dear Reviewer:

In accordance with provisions of the National Environmental Policy act of 1969, we enclose for your review the Draft Environmental Impact Statement (DEIS) for the Office of Ocean and Coastal Resource Management's Review of Amendments to the Alaska Coastal Management Program (ACMP).

Between 2003 and 2005, the State of Alaska adopted legislation and regulations that made revisions to its federally-approved Coastal Management Program. Alaska adopted the amendments to improve its consistency review process both in timing and predictability, thereby reducing duplication of permit review with broadly defined statewide standards, and provide certainty for private capital commitments. The State's legislative actions shifted the responsibility for program management from shared local and state responsibility to primarily state responsibility, with a more limited role for local participation. In addition, Alaska replaced the current statewide standards and mandated revision to all coastal district plans to achieve consistent statewide standards and coastal district enforceable policies that are non-duplicative of existing requirements. Alaska has submitted these revisions to NOAA as an amendment for federal approval.

The proposed federal action is OCRM's review of these changes to the ACMP pursuant to NOAA regulations on Amendments to Approved Management Programs (15 C.F.R. 923.80). An amendment is defined as a substantial change in, or substantial change to, enforceable policies or authorities related to: uses subject to management; special management areas; boundaries; authorities and organization, and coordination, public involvement, and national interest. When an amendment is submitted, OCRM must review the request to determine if the federally-approved management program, as amended, will still constitute an approvable program. NOAA's full approval of the amendment will allow continued federal funding for implementation of the ACMP and the State's use of the revised enforceable policies for Federal consistency purposes. In accordance with the amendment procedures, NOAA must assess the environmental impacts of the proposed amendment in order to satisfy the requirements of NEPA.

Hearings on the DEIS will be held on October 31, 2005 in Juneau, and November 1, 2005 in Anchorage.

A copy of the DEIS is enclosed for your information. It is also available to view online at http://coastalmanagement.noaa.gov/pcd/up.html.

Any written comments you may have should be submitted to Helen Bass, Coastal Programs Division, Office of Ocean and Coastal Resource Management, NOS/NOAA, SSMC4 N/ORM3 Rm. 11207, 1305 East-West Highway, Silver Spring, MD 20904 or Helen.Bass@noaa.gov by November 7, 2005.

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ACMP	Alaska Coastal Management Program
ADFG	Alaska Department of Fish and Game
AMSA	Areas which Merit Special Attention
ANCSA	Alaska Native Claims Settlement Act
ANILCA	Alaska National Interest Lands Conservation Act
ANWR	Alaska National Wildlife Refuge
AOGCC	Alaska Oil and Gas Conservation Commission
ATSA	Alaska Tourism Satellite Account
BBO	Billion Barrels of Oil
Bcf	Billion cubic feet
BLM	Bureau of Land Management
CFEC	Commercial Fisheries Entry Commission
CMP	Coastal Management Program
CO	Carbon Monoxide
CPC	Coastal Policy Council
CRSA	Coastal Resource Service Area
CZMA	Coastal Zone Management Act
DEC	Department of Environmental Conservation
DGC	Division of Governmental Coordination
DGGS	Division of Geological and Geophysical Survey
DNR	Department of Natural Resources
DOG	Division of Oil and Gas
DOI	Department of Interior
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EO	Executive Order
EPA	Environmental Protection Agency
ESA	Endangered Species Act
F	Farenheit
FEIS	Final Environmental Impact Statement
HB	House Bill
IWC	International Whaling Commission
LNG	Liquified Natural Gas
Mmbf	Million board feet
MMPA	Marine Mammal Protection Act
MMS	Minerals Management Service
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NMFS	NOAA Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPRA	National Petroleum Reserve-Alaska

OCRM	Office of Ocean and Coastal Resource Management
OCS	Outer Continental Shelf
OHMP	Office of Habitat Management and Permitting
OPMP	Office of Project Management and Permitting
PM	Particulate Matter
PSD	Prevention of Significant Deterioration
SAMP	Special Area Management Plan
SB	Senate Bill
t	metric tons
TAPS	Trans-Alaska Pipeline System
tcf	Trillion cubic feet
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

Draft Environmental Impact Statement For
Office of Ocean and Coastal Resource Management Approval of
Amendments to the State of Alaska's Coastal Management Program

Lead Agency: National Oceanic and Atmospheric Administration
National Ocean Services

Responsible Official: Richard Spinrad, Ph.D., Assistant Administrator

For Further Information Contact: Helen C. P. Bass
Office of Ocean and Coastal Resource Management
1305 East-West Highway
Silver Spring, Maryland 20902
(301) 713-3155, Extension 175

Abstract: This Environmental Impact Statement (EIS) is prepared pursuant to the National Environmental Policy Act (NEPA) U.S.C. 4321 et.seq. to assess the environmental impacts associated with the approval and implementation of several changes to Alaska's Coastal Management Program, submitted by the State of Alaska to the National Oceanic and Atmospheric Administration (NOAA). Pursuant to the Coastal Zone Management Act of 1972, as amended (CZMA) and Office of Ocean and Coastal Resource Management (OCRM) regulations on amendments to approved state coastal zone management programs (15 CFR part 923, subpart H), states must submit changes to their programs and their enforceable policies to OCRM for approval in order to allow continued federal funding for program implementation and application of federal consistency under the new enforceable policies. The proposed federal action under the NEPA is OCRM's review of the incorporation of the revised program and its enforceable policies into the Alaska Coastal Management Program (ACMP).

Between 2003 and 2005, the State of Alaska adopted legislation and regulations that made revisions to its federally-approved Coastal Management Program. The program changes that Alaska has adopted are significant and contain many potentially controversial elements. Alaska adopted the amendments to improve its consistency review process both in timing and predictability, thereby reducing duplication of permit review with broadly defined statewide standards, and provide certainty for private capital commitments. Methods for achieving these goals included legislative actions that eliminated the original ACMP's Coastal Policy Council and transferred the lead agency function from the Division of Government Coordination to the Alaska Department of Natural Resources; replaced the current statewide standards and mandated revision to all coastal district plans to achieve statewide standards and coastal district enforceable policies that are less susceptible to subjective interpretation and non-duplicative of existing requirements; and clarified that matters regulated or authorized by State or federal law are not

allowable topics for coastal district enforceable policies, unless the policy relates specifically to a matter of local concern. In addition, certain activities that previously were subject to the coastal consistency review process are now exempt; and limits have been placed on parties who have standing to file legal claims challenging ACMP consistency decisions.

The purpose of OCRM's approval of Alaska's program change request would be to allow the State to continue its certification as a federally-approved CMP, receive CZMA funds to implement the revised program, and conduct State and federal consistency reviews based on the revised program policies. This EIS evaluates the environmental consequences for three alternatives that are available to OCRM: (1) approve Alaska's request to incorporate the amendment as part of the State's federally-approved coastal management program; (2) the "no action alternative, where OCRM takes no action or is slow to act; or (3) deny the amendment, based on a finding that the changes to the ACMP do not meet the requirements of the CZMA and/or other federal statutes, and return the amendment request to the State for further consideration. By operation of Alaska State law, disapproval would lead to the repeal and termination of the ACMP because Section 22 of Senate Bill 102 mandates the repeal and termination of the ACMP if OCRM fails to approve the amendment before January 1, 2006. This includes the repeal and termination of all of the ACMP standards, district programs, the federal consistency provisions, and shared federal/state funding under the CZMA.

EXECUTVE SUMMARY

The proposed Federal action is the Office of Ocean and Coastal Resource Management's (OCRM) review of Alaska's request to incorporate Executive Order 106, House Bills 191, 69, and 86, Senate Bill 102, revisions to the statute AS 46, and new implementing regulations at 11 AAC 110, 11 AAC 112, and 11 AAC 114 as amendments to the Alaska Coastal Management Program (ACMP) pursuant to OCRM regulations on Amendments to Approved Management Programs (15 C.F.R. part 923, subpart H). When an amendment is submitted, OCRM must review the request to determine if the federally-approved management program, as changed by the amendment request, will still constitute an approvable program. This action requires a preliminary determination that the ACMP, as amended by EO 106, HBs 191, 69, and 86, SB 102, and the new and revised regulations, will still meet the substantive requirements of the CZMA in five categories: uses subject to management, special management areas, boundaries, authorities and organization, and coordination, public involvement, and national interest. Approval of the amendment would allow continued federal funding for implementation of the ACMP and the State's reliance upon the revised enforceable policies throughout the State's coastal zone for Federal consistency under section 307 of the CZMA, 16 USC §1465. OCRM has made preliminary Findings of Approvability (*See* Appendix A). These Findings provide a detailed analysis of approvability of these changes.

In accordance with the amendment procedures, NOAA must assess the environmental impacts of the proposed amendment in order to satisfy the requirements of National Environmental Policy Act (NEPA).

There are three major alternatives for consideration. First, OCRM can approve the Alaska program change amendment submitted on June 2, 2005, thereby incorporating the amendment into the federally-approved ACMP. Second, there is the "no action" alternative where OCRM takes no action or is slow to act. By operation of Alaska State law, disapproval would lead to the repeal and termination of the ACMP because Section 22 of Senate Bill 102 mandates the repeal and termination of the ACMP if OCRM fails to approve the amendment before January 1, 2006. This includes the repeal and termination of all of the ACMP standards, district programs, the federal consistency provisions, and shared federal/state funding under the CZMA. Third, OCRM can deny the amendment, based on a finding that incorporating these changes into the ACMP by granting the State federal approval does not meet the requirements of the CZMA and/or other federal statutes, and return the amendment request to the State for further consideration. As with the second alternative, under Alaska State law, failure to approve the State's request act would lead to the repeal and termination of the ACMP.

Based on a review of the affected environmental and possible impacts to the human environment, OCRM has determined that the majority of the changes proposed under the ACMP's program amendment are likely to result in neutral effects to the physical environment, relative to the pre-amendment ACMP. The primary result of the State's amendments to its program is a shift from State and local plan implementation to primarily State implementation

using State standards and State law. In response to legislative mandates, the State's coastal standards were rewritten to avoid redundancy with other State statutes, regulations, and programs. Potential positive results include a more efficient permitting operation for activities in the coastal area; greater clarity and guidance in some of the statewide coastal standards; financial savings and time savings for investors; and economic benefits to the State from increased investment. In terms of negative effects to the physical environment, the major issues involve the new subsistence standards and process requiring designation for subsistence areas. There is concern that they may reduce the level of district policies and review for subsistence uses. In addition, the State has removed the ability for districts to seek mitigation for any damages resulting to subsistence areas from permitted activities. These changes have the potential to result in negative effects to subsistence resources. Insomuch as there are any negative effects to subsistence resources, potential environmental justice issues have been identified.

There would be negative effects for both physical and socio-economic resources if either alternative two or three were to occur. Under these alternatives, as mentioned previously, the ACMP would sunset, according to State law, and the State would no longer participate in the national program. The result would be the loss of ACMP standards as well as district programs, in addition to the loss of the State's ability to apply federal consistency. It is assumed that the State's other natural resource statutes, regulations and programs would continue to exist, and the State's current proposed reliance on these statutes for protection of its coastal resources would be tested in full. However, except as may be required by other federal laws, federal agencies would no longer be compelled to meet State standards within the coastal area. Negative effects on the socio-economic resources would be the loss of both the State and the districts' ability to participate in the federal program, which currently provides approximately $2.5 million per year to the State in CZMA funding, and the ability to apply federal consistency.

Ultimately, NOAA's preferred alternative is to approve Alaska's request to incorporate EO 106, HBs 191, 69, 86, SB 102, revisions to statute AS 46, and regulations at 11 AAC110, 11 AAC 112, and 11 AAC 114 as a program amendment to the ACMP.

1. INTRODUCTION

1.1 Approval of the Alaska Coastal Management Program

Recognizing the need for coordinated effort to manage the nation's coastal resources, Congress passed the federal Coastal Zone Management Act (CZMA) in 1972, 16 USC 1451-1465. The CZMA established a voluntary program for the management, beneficial use, protection, and development of the land and water resources of the nation's coastal areas. The federal program encourages states to exercise more fully their authorities and responsibilities related to coastal resources.

The CZMA provides guidelines for the development of state coastal management programs. The implementing federal regulations at 15 CFR part 923, subparts B-G, outline the requirements for state program development and approval. Subpart H of these regulations includes the guidelines for changing an approved state program. Changes to an approved program may be processed as either a matter of routine program change or as an amendment (15 CFR part 923, subpart H).

The Alaska Coastal Management Program (ACMP) was approved by the Secretary of Commerce in July 1979. The program is based on the Alaska Coastal Management Act of 1977 (ACMA) which established an approach of shared local and State coastal management responsibilities. The ACMA originally created the Coastal Policy Council (CPC) to direct the State coastal program. The CPC was staffed by both State and local government representatives, and until the recent legislative changes, was responsible for approving statewide standards and guidelines for the management of coastal land and water uses. The CPC also reviewed and approved local coastal programs. The Governor's Office of Management and Budget, Division of Governmental Coordination served as staff to the CPC and was the lead ACMP agency. The ACMP sets forth guidelines and standards related to coastal resources and provides for local coastal programs to implement the ACMP provisions.

1.2 Development of the Regulatory Changes to the ACMP: EO 106, HBs 191, 69, 86, Senate Bill 102, Revisions to Statute AS 46, and Regulations at 11 AAC 110, 11 AAC 112, and 11 AAC 114

The State of Alaska submitted a package of legislative and regulatory changes to the Office of Ocean and Coastal Resource Management (OCRM) as a program change to the ACMP, including Executive Order (EO) 106, House Bills (HBs) 191, 69, 86, and SB 102 along with revisions to statute AS 46, and the new implementing regulations at 11 AAC 110, 11 AAC 112, and 11 AAC 114. The new implementing regulations replace the existing consistency review procedure regulations at 6 AAC 50, the statewide standards at 6 AAC 80, and the district program guidelines at 6 AAC 85. and 6 AAC 85. On February 12, 2003, Governor Frank Murkowski introduced Executive Order (EO) 106 into the Alaska State Legislature, Senate and House of Representatives. The HBs and regulations were introduced and signed into law between May 21, 2003 and May 26, 2005. In essence EO 106 and HB 191 transfer

responsibility for implementation of the ACMP from the Division of Governmental Coordination in the Governor's Office to the Department of Natural Resources (DNR). HB 191 eliminates the CPC, and transferred authority for development of statewide standards for the ACMP and review and approval of district coastal plans to DNR. In addition, HB 191 requires DNR to adopt new regulations by July 1, 2004 which establish "clear and enforceable" statewide standards for the ACMP as well as criteria for approval of new district coastal plans. The current district plans were to sunset as of July 1, 2006, and the districts are being required to develop new plans based on the new standards and guidelines and submit them to DNR by July 1, 2005. Under HB 69, shallow gas exploration and development projects that are conducted under the oversight and regulation of the Alaska Oil and Gas Conservation Commission and State resource agencies are automatically determined to be "consistent" with the ACMP. HB 86 specifies that, with respect to a State consistency determination, only an applicant or affected coastal resource district is eligible to appeal a non-constitutional matter. Otherwise, the consistency determination is not subject to review, stay or injunction by the State courts. In May 2005, SB 102 was signed into law in order to extend the time frame for completing State and district program changes and address other programmatic issues that had arisen during the initial phase of ACMP revision implementation. Detailed descriptions of the new and revised laws and regulations are provided in section five of this document.

DNR kept OCRM apprised on its preparation and adoption of the statutory revisions and the revised ACMP regulations addressing the consistency review process, the statewide standards and the guidelines for the district plans. The districts and public were involved in the process through district conferences and other public comment opportunities on the proposed regulations. The draft regulations were issued for public review and comment on February 20, 2004; the comment period ended on April 2, 2004. DNR considered the comments, made amendments, and adopted a revised version of the regulations that went into effect July 1, 2004. In addition, on August 9, 2004, DNR's Office of Project Management and Permitting (OPMP) released a second set of limited proposed changes to the regulations for public review and comment, which were subsequently amended and adopted as revised on September 24, 2004. These went into effect on October 29, 2004. It should be noted that while the regulations have become effective as State regulation, the statewide standards will only apply to consistency reviews after the date the DNR Commissioner has certified to the Lieutenant Governor that the United States Department of Commerce has approved these as program changes to the ACMP. Local coastal districts are still expected to prepare revised plans based on the new standards, as required under SB 102. Existing district plans and enforceable policies that were approved by the CPC will remain in effect until March 1, 2007, unless DNR reviews and approves new enforceable policies prior to that date.

On September 30, 2004, the ACMP, through DNR, requested OCRM to incorporate EO 106, HBs 191, 69, and 86, and the new and revised implementing regulations into the federally-approved State program as a program amendment. On November 4, 2004, OCRM notified Alaska that based on the State's submission, OCRM lacked sufficient information to make a decision or finding of preliminary approval under CZMA section 306(e)(3)(B), and therefore was extending the time for its review of the Alaska program change submission for a period not to exceed 120 days (March 4, 2005). OCRM provided its comments on two charts detailing the

additional information that was needed from DNR to resubmit a complete amendment package. On May 20, 2005, DNR held a public hearing to solicit comments regarding Alaska's submission of its amendment request to OCRM regarding the ACMP. The public hearing was held to meet the requirements of 16 U.S.C. 1455(d)(4) and 15 C.F.R. 923.81(a). Once these public hearing requirements had been met, on June 2, 2005, Alaska resubmitted a revised request for amendment to the ACMP that also included SB 102.

Based on OCRM's review of the June 2, 2005 submission, on June 27, 2005 OCRM issued preliminary approval of the ACMP, as amended.

1.3 Nature of the Federal Action

The proposed federal action is OCRM's review of these changes to the ACMP pursuant to NOAA regulations on Amendments to Approved Management Programs (15 C.F.R. 923.80). An amendment is defined as a substantial change in, or substantial change to, enforceable policies or authorities related to:

(1) Uses subject to management (15 C.F.R. part 923, subpart B)

(2) Special Management Areas (15 C.F.R. part 923, subpart C)

(3) Boundaries (15 C.F.R. part 923, subpart D)

(4) Authorities and Organization (15 C.F.R. part 923, subpart E)

(5) Coordination, Public Involvement and National Interest (15 C.F.R. part 923, subpart F)

When an amendment is submitted, OCRM must review the request to determine if the federally-approved management program, as changed by the amendment request, will still constitute an approvable program. This requires a preliminary determination that the ACMP, as amended by EO 106, HBs 191, 69, and 86, SB 102, and the new and revised regulations, will still meet the substantive requirements of the CZMA in the categories listed above. The preliminary Findings of Approvability have been made and are included as Appendix A. These Findings provide a detailed analysis of approvability of these changes. Accordingly, reviewers should note that except during the discussion of alternatives, this Environmental Impact Statement (EIS) does not focus on approvability issues.

In accordance with the amendment procedures, NOAA must assess the environmental impacts of the proposed amendment in order to satisfy the requirements of National Environmental Policy Act (NEPA). Because NEPA and the CZMA have similar goals, the information used in the NEPA process will also be used to help make a final determination whether the ACMP, as amended by the program changes, still constitutes an approvable state program under the CZMA.

This EIS addresses the NEPA requirements under the guidelines established by OCRM (OCRM Administrative Order 216-6, "Environmental Review Procedures for Implementing the National Environmental Policy Act," May 20, 1999). This EIS analyzes the potential environmental impacts of the policies and provisions of the program changes to the human environment, as described in section 6.

1.4 Notice of Intent and Scoping Process

On June 24, 2005, OCRM published a Notice of Intent to prepare an EIS on Alaska's request to incorporate EO 106, HBs 191, 69, 86, and SB 102, revisions to statute AS 46, and regulations at 11 AAC 110, 11 AAC 112, and 11 AAC 114 into the ACMP. The public comment period was open until August 5, 2005. OCRM solicited public comment to identify alternatives to approving the amendments to the ACMP, and potential impacts of the proposed alternatives. OCRM held meetings in Barrow on July 25, 2005, Anchorage on July 27, 2005 and Juneau on July 28, 2005.

During the scoping process, three ways were provided to submit comments to OCRM on approval of the ACMP amendments:

(1) Public meetings;
(2) E-Mail
(3) Traditional Mail Delivery

Twenty-two people participated in the scoping process. They represented environmental organizations, industry, and local, State, tribal and federal governments. Comments provided during the public meeting were captured by a court reporter. Approximately half of the participants submitted input at the public meetings, with the other half submitting comments by e-mail or letter. Some commenters submitted through multiple channels. All of the comments originated from Alaska.

OCRM considered all comments one month prior to and during the formal scoping period and used them to identify the key environmental issues to be addressed. A summary of the public comments and primary issues raised during the meetings is in the Scoping Report (Appendix B). Below is a list of significant issues identified during the scoping process that will receive particular attention in this analysis.

- Consolidation of decision-making authority within DNR
- Effects of Department of Environmental Conservation (DEC) Carve Out
- Effects of changes to consistency review requirements
- Effects of changes on subsistence uses and resources
- Effects of changes to habitat standards
- Effects of removal of mining from ACMP standards
- Removal of mitigation requirements
- Effects of changes to district plan requirements
- Environmental justice issues associated with changes to the ACMP

2. PURPOSE

OCRM is responsible under the CZMA for approving any program changes made by a state to its original federally-approved coastal management program (CMP). Changes that must be submitted are those that (1) affect the CMP as approved by OCRM; (2) the state CMP wishes to spend CZMA funds on; and (3) the state CMP wishes to use for federal consistency review purposes. The State of Alaska has submitted a package of substantial changes to the ACMP's organization, participation structure, implementation, policies, and administration of those policies for OCRM review and approval. The purpose of OCRM's approval of Alaska's program change request would be to allow the State to continue its certification as a federally-approved CMP, receive CZMA funds to implement the revised program, and conduct State and federal consistency reviews based on the revised program policies.

3. NEED

The CZMA regulations define two types of program changes: amendments and routine program changes. As discussed above, amendments are defined in 15 C.F.R. 923.80(d), as substantial changes in one or more of five program areas. Whether or not a program change is substantial is based on a case-by-case determination. Indicators of a substantial change include: new or revised enforceable policies that address coastal uses or resources not previously managed, or major changes in the way a state CMP manages uses or resources; the extent to which the proposed change impacts the national interest reflected in the CZMA (e.g., Outer Continental Shelf (OCS) oil and gas development, energy facility siting, water and air quality, etc.); and the extent to which the proposed change is similar to past program change requests by any state that were treated as amendments. OCRM has determined that Alaska's program change submission qualifies as a substantial change to three of the five program areas listed above: (1) uses subject to management; (2) authorities and organization; and (3) coordination, public involvement, and national interest. In addition, OCRM has found Alaska's program change to be substantial, both in terms of the revisions in the way the State is managing the uses and resources, and because the scope of the changes represents one of the most comprehensive changes to a state coastal program in the history of the CZMA. Therefore, OCRM is required under the CZMA to conduct a review and approval process for Alaska's program change submission as an amendment, which includes the production of an EIS.

4. ALTERNATIVES

The proposed federal action is OCRM's approval of Alaska's EO 106, HBs 191, 69, and 86, Senate Bill 102, revisions to the statute AS 46, and new implementing regulations at 11 AAC 110, 11 AAC 112, and 11 AAC 114 as amendments to the ACMP pursuant to OCRM regulations on Amendments to Approved Management Programs (15 C.F.R. part 923, subpart H). In determining whether Alaska's new laws constituted an amendment, OCRM found that Alaska's submission qualified as an amendment under three of the five program areas. When an amendment is submitted, OCRM must also review the request to determine if the federally-approved management program as changed by the amendment request, will still constitute an

approvable program. This requires a preliminary determination the ACMP, as amended by the new laws will still meet the substantive requirements of the CZMA in the categories listed above (15 C.F.R. part 923, subpart H). The preliminary Findings of Approvability have been made and are included as Appendix A. These Findings provide a detailed analysis of approvability of this amendment. Accordingly, reviewers should note that except during the discussion of alternatives, this EIS does not focus on approvability issues.

There are three major alternatives for consideration. First, OCRM can approve the Alaska program change amendment submitted on June 2, 2005, thereby incorporating the amendment into the federally-approved ACMP. Second, there is the "no action" alternative where OCRM takes no action or is slow to act. By operation of Alaska State law, disapproval would lead to the repeal and termination of the ACMP because Section 22 of Senate Bill 102 mandates the repeal and termination of the ACMP if OCRM fails to approve the amendment before January 1, 2006. This includes the repeal and termination of all of the ACMP standards, district programs, the federal consistency provisions, and shared federal/state funding under the CZMA. Third, OCRM can deny the amendment, based on a finding that incorporating these changes into the ACMP by granting the State federal approval does not meet the requirements of the CZMA and/or other federal statutes, and return the amendment request to the State for further consideration. As with the second alternative, under Alaska State law, failure to approve the State's request act would lead to the repeal and termination of the ACMP. The three available alternatives are discussed below based on the merits of the specific proposals identified during the review process.

4.1 Alternative 1: Approve Alaska's Request to Incorporate EO 106, HBs 191, 69, 86, SB 102, Revisions to Statute AS 46, and Regulations at 11 AAC 110, 11 AAC 112, and 11 AAC 114 as a Program Amendment [Preferred Alternative]

Alaskans statewide are interested in encouraging responsible coastal development. There are both general and practical considerations that applicants use in judging whether to invest in resource development in Alaska. One of the most important considerations is the structure and predictability of the permitting laws for a state. Applicants are more likely to seek a regulatory structure that is easily navigable and predictable. Applicants must know what the permitting rules are up front, how to comply with those rules, how much compliance will cost, and how long the permitting process will take. The lack of predictability in permitting may cause apprehension on the part of industry deciding whether to invest in resource development in Alaska. The result can be the loss of investment, and delay of project start dates which can result in significant safety issues and project delays.

The current Administration in Alaska concluded that project design, siting, and review under the ACMP structure were resulting in costly delays because the applicable statewide standards and district plan enforceable policies were confusing or otherwise duplicative of existing State or federal regulation. OCRM's approval of Alaska's request to incorporate the amendments to its Coastal Management Program, as described, would update and reform the

ACMP and address these concerns. Under this alternative, OCRM would approve Alaska's request to incorporate the new statutes and new and revised regulations into the ACMP. The ACMP would be implemented as the State's new program, and the State would continue to receive federal funding to implement the program. The new statutes and regulations would become the federally-approved authorities which Alaska would use to apply federal consistency.

4.2 Alternative 2: No Action—Failure to Approve Alaska's Request to Incorporate EO 106, HBs 191, 69, 86, SB 102, Revisions to Statute AS 46, and Regulations at 11 AAC 110, 11 AAC 112, and 11 AAC 114 as a Program Amendment before January 1, 2006, resulting in the abolishment of the ACMP through Statutory Sunset Provisions

The no action alternative, required to be analyzed in an EIS by C.F.R. 1502.14(d), is the most likely outcome that can be expected to occur in the absence of agency action, and is described for comparison with the proposed action and any alternatives. Under the CZMA, if OCRM did not act on a state's proposed amendment to a coastal management plan, the amendment would eventually be conclusively presumed as approved. 16 U.S.C. 1455(e)(2). In this case, however, Alaska has enacted a statute which will repeal the ACMP if OCRM does not approve the proposed amendment before January 1, 2006. Alaska statute SB 102, Section 22 contains language that repeals the ACMP effective July 1, 2010, if the revised coastal management program has not been approved by OCRM under the CZMA before January 1, 2006, in which case the repeal of the ACMP takes effect on May 10, 2006. Alaska could, of course, consider changing its laws at any time during the next regularly scheduled legislative session (January 2006 – May 2006), but given existing law, the most likely outcome if OCRM failed to act before January 1, 2006, is the repeal and termination of the ACMP.

Repeal and termination of the ACMP would ensure that it would be an unenforceable program under the CZMA, lead to State withdrawal from the national program, and have serious repercussions to not only the national program, but to Alaska state agencies, districts, and local communities within Alaska's coastal zone. The same effects would occur if Alaska decides to withdraw from the voluntary program.

Since 1974, Alaska has received nearly $160 million under provisions of the CZMA. Much of these grant funds were matched by the State and this represents a considerable investment to achieve coastal management objectives and policies as identified by the State. It is difficult to describe all the potential negative impacts and consequences that would result from the lack of future federal funds. There would also be the loss of the federal consistency provisions, which is often the only means for a state to have meaningful input into federal agency activities, federal license or permit activities, OCS oil and gas plans and federal financial assistance activities. While Alaska has fine tuned the consistency provisions over the years, it has served as a mechanism that has given State agencies and districts a greater voice in large scale projects. To a large degree, these are subjective values different interests would place on the loss of program participation. For the reasons cited above, this is not NOAA's preferred alternative.

4.3 Alternative 3: Deny Alaska's Request to Incorporate Alaska's Request to Incorporate EO 106, HBs 191, 69, 86, SB 102, Revisions to Statute AS 46, and Regulations at 11 AAC 110, 11 AAC 112, and 11 AAC 114 as a Program Amendment

Alaska's request to incorporate the new and revised laws and regulations was processed as an amendment to the ACMP because it was considered to be a substantial change to several aspects of their program, including uses subject to management; authorities and organization; and coordination, public involvement, and the national interest. The application of these extensive changes to Alaska's coastal area brought into question whether the State would still meet the requirements of the CZMA. Several concerns were raised by the public during the program change request process, including limiting the effectiveness of the ACMP through 1) reduction in local districts' participation in oversight of locally important resources, particularly subsistence issues through revisions to Alaska's coastal standards and district plan guidance; 2) eliminating federal consistency review requirements for shallow gas and coal bed methane activities; 3) reducing the opportunity for public comment on consistency review of DEC activities and other activities covered on the A or B list, by encouraging the expansion of activities to be included on these lists; 4) narrowing the scope of ACMP review to cover only those activities requiring permits within the coastal zone, rather than the "whole project" impacts, or projects outside the coastal zone that might have significant impacts on coastal resources; 4) centralizing all district plan and State standards and appeals decisions within DNR by eliminating the CPC; and 5) removing the ability for a citizen to litigate an ACMP consistency determination.

Under this alternative, OCRM would deny approval of Alaska's request to incorporate the new statutes and new and revised regulations into the ACMP. This would lead to exactly the same result as the "no action" alternative: the repeal and termination of the ACMP due to the Alaska statute SB 102, discussed above. The advantages of participation in the federal program would not be available to the State, including a comprehensive and effective program, federal funding, and federal consistency. For the reasons cited above, this is not NOAA's preferred alternative.

5. CHANGES TO THE ALASKA COASTAL MANAGEMENT PROGRAM

This section provides a synopsis of the changes submitted by the Alaska DNR on June 2, 2005, which is attached as Appendix C. Appendix C provides a detailed description of the new program as implemented under the newly adopted laws and regulations, including a detailed description of the program changes (*See* Chapter 10, pages 191– 249). The purpose of this section is to describe succinctly and specifically how the previous program areas differ under the new program requirements.

5.1 EO 106

On February 12, 2003, Governor Frank Murkowski introduced EO 106 into the Alaska State Legislature, Senate and House of Representatives. Per article III, section 23 of the Alaska

Constitution:

> The governor may make changes in the organization of the executive branch or in the assignment of functions among its units which he considers necessary for efficient administration. Where these changes require the force of law, they shall be set forth in executive orders. The legislature shall have sixty days of a regular session, or a full session if of shorter duration, to disapprove these executive orders. Unless disapproved by resolution concurred in by a majority of the members in joint session, those orders become effective at a date thereafter to be designated by the governor.

EO 106 transferred the Alaska Coastal Policy Council from the Office of the Governor to the Department of Natural Resources, and transferred the function of the Division of Governmental Coordination within the Office of the Governor to the Department of Natural Resources. These transfers were done (a) in the best interests of efficient administration; (b) to permit better access to scientific information and state personnel with technical expertise on projects affecting the coastal zone; and (c) to permit closer coordination to improve the planning process for projects affecting the coastal zone.

Though there were no legislative hearings on EO 106, the legislature did consider the substance of EO 106 in the 2003 joint session, did not disapprove that order, and the order became effective on April 15, 2003. EO 106 called for reform legislation, namely HB 191, which in turn led to statutory revisions at AS 46.39 and AS 46.40, and the implementing regulations at Title 11 of the Alaska Administrative code.

5.2 HB 191

There are four essential components to HB 191. The first component was to eliminate the CPC and transfer its authority for the development of statewide standards of the ACMP and the approval of district coastal management plans to DNR. The second component was to require that DNR adopt regulations by July 1, 2004 establishing clear and enforceable statewide standards of the ACMP and criteria for the approval of new district coastal management plans. DNR was to retain coastal resource districts and how they operate under the ACMP, but require the districts to revise their plans. Under HB 191, the districts were required to submit their new plans within one year of the effective date of DNR's new regulations, or July 1, 2005, whichever was later. In addition, existing district plans were to sunset by July 1, 2006 (except for those submitted by July 1, 2005 and approved by DNR). (Extensions to these dates were made under SB 102. *See* discussion below) The third component was to streamline the ACMP by relying on the requirements of the DEC and their implementing regulations as the enforceable policies of the ACMP for those purposes and relying on DEC's implementation of those requirements in order to determine consistency for those parts of a development projects. Finally, the fourth component was to clarify when a consistency review is required under the ACMP, the scope of the activities subject to the review, and the standards against which the project will be measured. A more detailed sectional analysis of HB 191 is provided in Appendix C, the State's program amendment submission. In addition, the specific changes are described below.

5.2.1 HB 191, 11 AAC 110 – Consistency Revisions

This section describes the State consistency and federal consistency requirement and the changes made to the ACMP's consistency process. For more detailed information on the CZMA federal consistency requirements, *see* CZMA section 307 (16 U.S.C. 1456) and OCRM's federal consistency regulations, 15 C.F.R. part 930. Additional information on federal consistency is located on OCRM's federal consistency web page at: www.coastalmanagement.OCRM.gov/czm/federal_consistency.html.

5.2.1.1 Federal Consistency

The CZMA federal consistency provision is a cornerstone of the CZMA program and a primary incentive for States' participation. Federal consistency provides states with an important tool to manage coastal uses and resources and to facilitate cooperation and coordination with federal agencies. Federal consistency is a limited waiver of federal supremacy and authority.
Federal agency activities that have coastal effects must be consistent to the maximum extent practicable with the federally-approved enforceable policies of a state's CZMA program. In addition, non-federal applicants for federal authorizations and funding must be fully consistent with the enforceable policies of state CZMA programs.

Federal consistency reviews are the responsibility of a lead state agency within a state's federally-approved CZMA program. In Alaska, the lead State agency is the Alaska DNR. At the federal level, OCRM, within NOAA's National Ocean Service, among other duties and services, interprets the CZMA and oversees the application of federal consistency; provides management and legal assistance to coastal states, federal agencies, Tribes and others; and mediates CZMA related disputes. NOAA's Office of General Counsel for Ocean Services assists OCRM and processes appeals to the Secretary of Commerce.

Federal consistency is the CZMA requirement that federal actions that have reasonably foreseeable effects on any land or water use or natural resource of the coastal zone (also referred to as coastal uses or resources, or coastal effects) must be consistent with the enforceable policies of a coastal state's federally-approved CZMA program. There are four basic types of federal actions: federal agency activities, federal license or permit activities, OCS plans, and federal financial assistance to state and local governments:

1) Federal agency activities – activities and development projects performed by a federal agency, or a contractor for the benefit of a federal agency, e.g. Fishery Management Plans by the NOAA Marine Fisheries Service (NMFS), Naval exercises, the disposal of federal land by the General Services Administration, a U.S. Army Corps of Engineers (Corps) breakwater or beach renourishment project, an OCS oil and gas lease sale by the Minerals Management Service (MMS), improvements to a military base, Naval disposal of radioactive or hazardous waste performed by a private contractor, activities in National Parks such as installation of mooring

buoys or road construction.

2) Federal license or permit activities – activities not performed by a federal agency, but requiring federal permits, licenses or other forms of federal approval; e.g., activitiqes requiring Corps 404 permits, Corps permits for use of ocean dump-sites, Nuclear Regulatory Commission licenses for nuclear power plants, licenses from the Federal Energy Regulatory Commission (FERC) for hydroelectric facilities.

3) OCS plans – MMS approvals for OCS plans, pursuant to the Outer Continental Shelf Lands Act. The CZMA process is similar to federal license or permit activities.

4) Federal financial assistance to state and local governments – examples include Federal Highway Administration funds to coastal state and local governments, construction grants for wastewater treatment works, hazardous waste management trust fund, and Housing and Urban Development grants.

5.2.1.2 State Consistency

State coastal management programs must ensure that the program is implemented in a consistent fashion among its various state agencies and, if applicable, local governments. This requirement is derived primarily from CZMA section 306(d)(10)(A) (16 U.S.C. 1455(d)(10)(A)) ("to administer land use and water use regulations to control development to ensure compliance with the management program and to resolve conflicts among competing uses."). Other sections also speak to state consistency, e.g., CZMA sections 306(d)(2)(D), (d)(2)(F), (d)(3)(B) and (d)(7). In OCRM's regulations the state consistency requirement is mandated at 15 C.F.R. 923.1(c)(6) ("[i]ncludes sufficient legal authorities and organizational arrangements to implement the program and to ensure conformance to it"), and 923.1(c)(8) ("[p]rovides a mechanism to ensure that all state agencies will adhere to the program").

5.2.1.3 The ACMP Consistency Process

The ACMP consistency review process requirements are contained in 11 AAC 110. The general procedures and milestones associated with the consistency review process are explained in detail in Chapter 6 of the ACMP Program Document (Appendix C). The consistency process for the ACMP has changed little. The general consistency review process, both before and after the ACMP changes, can be summarized by the following sequence of events:

(1) Applicability determined;
(2) State provides pre-review assistance;
(3) State determines packet completeness (including a "Coastal Project Questionnaire;"
(4) State determines scope;
(5) State issues public notice;
(6) Review begins (Day 1);
(7) Deadline for comments (Day 17 or 30, depending upon review type);
(8) State considers comments, resolves issued raised;

(9) State issues proposed determination (Day 24 or 44, depending upon review type);
(10) Applicant considers options, including elevation;
(11) State issues final determination (Day 30/50).

With that summary, the following describes the changes to the consistency review process since Alaska's statutory amendments to AS 46.39 and AS 46.40, regulatory revisions at 11 AAC 110, 112, and 114, and laws passed by the Legislature: HB 69, HB 86, HB 191, and SB 102:

5.2.1.3.1 Lead agency

Prior to these ACMP changes the Division of Governmental Coordination (DGC) within the Office of the Governor coordinated the consistency review process and issued federal consistency decisions. This function now resides within the OPMP, within the DNR.

5.2.1.3.2 Trigger point for consistency review

AS 46.40.096(j) and 11 AAC 110.010(b). (The ACMP Program Document (June 2, 2005) at section 6.1 incorrectly cites 11 AAC 110.050(b).) These sections clarify the applicability of the consistency review process. The 2003 statutory change simply reflects the 2002 regulatory changes already approved by OCRM as a previous program change.

5.2.1.3.3 Scope of review

AS 46.40.096(k), 11 AAC 110.020, and 11 AAC 110.225 established that the scope of the review for a project only requiring a State permit is limited to activities located within the coastal zone and geographic location descriptions, subject to a State resource agency permit, or is the subject of a coastal district enforceable policy. Previously, the scope of the project subject to review was not well defined. The scope of a project subject to federal consistency review did not change and is determined by CZMA section 307 and OCRM's regulations at 15 C.F.R. part 930.

5.2.1.3.4 Phasing

AS 46.40.094 establishes the provisions for allowing a project to be reviewed in phases. Previously, this section was written specifically for oil and gas exploration and development type projects, to the exclusion of other applications. As amended, this section allows other development type project reviews to be phased, as appropriate.

5.2.1.3.5 Elevation

AS 46.40.096(d)(3) and 11 AAC 110.600 establish the general process and limitations for "subsequent reviews" (elevations) of proposed consistency determinations by the coordinating agency. Previously, elevations were reviewed by the three resource agency directors and/or commissioners, and were to be completed within 15 days of request of the elevation. As

amended, the elevation has been changed, such that elevations are now reviewed and decided upon by the DNR commissioner, with an extended timeframe for issuance of that decision.

5.2.1.3.6 Third party lawsuits

Alaska HB 86 (2003), section 3, removed the ability of third parties to file a lawsuit regarding a consistency determination made by the State. Previously third parties could file such lawsuits. Under the new ACMP, only applicants and affected coastal districts may file such lawsuits.

5.2.1.3.7 Exclusion of Alaska DEC permits and authorizations (the "DEC carve-out")

AS 46.40.040(b), AS 46.40.096(g) and (k), and 11 AAC 110.040 contain the DEC carve-out provisions. The DEC carve-out is described in Appendix C at section 6.6. Previously DEC permits and standards were part of the consistency review process. In addition, districts could adopt policies that addressed air and water quality concerns. Under the new ACMP, activities that are subject to authorization by DEC would be excluded from the consistency review process, and districts may not write policies that address issues under the jurisdiction of DEC. In the case of a DEC-only authorization project, only activities outside the activities addressed by the DEC authorization and are the subject of a district enforceable policy are subject to State consistency review. DEC has established ACMP consistency review procedures setting forth "Uniform Procedures for Conducting a Coastal Management Consistency Review for Projects that Only Require a DEC Permit or Contingency Plan Approval to Operate." These procedures will be used when a project only requires a DEC authorization and the activity is located within the boundaries of an approved district. Districts and the public retain the ability to comment on, and provide input to, DEC permit decisions under these provisions. For activities not requiring a DEC authorization because the activity is located on federal lands or waters, e.g., the federal OCS, the activity will nonetheless need to comply with DEC standards through the CZMA federal consistency review process and DEC will forward its findings to OPMP for OPMP's federal consistency decision.

5.2.1.3.8 Time limitations and certainty for consistency reviews

AS 46.40.096(n), (o), and (p) and 11 AAC 110.265 require that consistency reviews shall be completed within 90 days after receipt of the complete application for a project, except in specific circumstances. Previously, there were no deadlines for completing the consistency reviews, other than those general deadlines contained in OCRM's regulations at 15 C.F.R. part 930.

5.2.1.3.9 ABC List, general permits

AS 46.40.096(m) and section 19(b) of SB 102 (Chapter 31, SLA 2005) establish authority for the ABC List and require that the ABC List be comprehensively updated within two years of OCRM's approval of the ACMP changes. The most recent comprehensive revision

to the ABC List was approved by OCRM in 1995, with minor modifications approved in 1999 and 2002. The current ABC list, dated May 26, 2004, contains technical edits and updates reflecting prior consistency review determinations. The changes to the ABC List are non-substantive and generally limited to technical corrections, including correcting permit titles and names, correcting statutory and regulatory references, and including the most updated agency general permits and nationwide permits.

5.2.2 HB 191, 11 AAC 112 – State ACMP Standards

11 AAC 112 contains the State's revised coastal standards. Below is a detailed description of the revisions that have been made to the standards, compared against the existing approved ACMP. Changes that are not considered substantive and that are unlikely to result in impacts to the human environment have been identified. The analysis of effects of the changes on the affected environment considered to be substantive is found in Section 7.

5.2.2.1 Redefinition of Coastal Waters

The State has redefined the term 'coastal waters' to mean "contain[ing] a measurable quantity or percentage of sea water." (112.990(7)) Previously, under the old 6 AAC 80.900 (2), coastal waters were defined as, "all water 11 AAC bodies in the coastal area, including wetlands and the intertidal area." The definition now being used for 'coastal water' was previously used by the State under 6 AAC 85.900 (2) for 'marine coastal water,' which meant "water adjacent to shorelines which contains a measurable quantity of seawater." This will have implications for the revised standards discussed below, which are either limited to coastal waters or waters having a direct and significant effect on coastal waters: 1) coastal access; 2) sand and gravel extraction; 3) important habitats; 4) rivers, streams, and lakes; 5) wetlands; and 6) coastal zone boundaries. The effect of the amended regulations is to limit many of the enforceable standards to seawater. The impacts will be discussed under those sections, as necessary.

5.2.2.2 Public Participation and Information

No substantive changes were made to the public participation and information section, other than to move it to the guidance section of the regulations (*See* 5.5.1 below). This section will not be reviewed for effects. However, other aspects of public participation under separate issues such as changes to federal consistency and DEC authority will be analyzed.

5.2.2.3 Coastal Development (11 AAC 112.200)

Minor wording changes were made to this section now specifying that water "dependent" or "related" could include both economical or physical dependency or relationship, and that the determination would be made on whether there are "practicable inland alternatives" rather than the original program's "feasible and prudent inland alternatives." The new term "practicable" is

defined at 11 AAC 112.990(18) as "feasible in light of overall projects purposes after considering cost, existing technology and logistics of compliance with the standards." The previous terms "feasible and prudent" is defined in the original document as, "consistent with sound engineering practice and not causing environmental, social, or economic problems that outweigh the public benefit to be derived from compliance with the standard modified by the term 'feasible, and prudent.'" (p. 80, Final Environmental Impact Statement [FEIS])

5.2.2.4 Natural Hazard Areas (11 AAC 112.210)

This revision identifies what geophysical hazards either DNR or the districts should designate as natural hazard areas, as well as how other natural processes or adverse conditions in an area can qualify for designation. In addition, the changes now specify what agency (ies) would be the appropriate authority for identifying the appropriate measures in siting, designing, constructing and operating a proposed activity in a known hazard area. This change is more expansive than the original program's requirements.

5.2.2.5 Coastal Access (11 AAC 112.220)

Coastal access has now replaced the term "recreation," although it has retained essentially the same definition in terms of the designation of recreational use areas (*See* section AAC 114.250(c)(d)). However, the revised ACMP now requires that State agencies and districts "ensure" that projects maintain, and where appropriate, increase public access to, from, and along coastal waters, rather than the previous standard, which was "give high priority to." The scope of the policy is also now limited to the boundary of the new definition of "coastal waters" (*See* section 5.2.2.1 above). Previously, the policy served as a planning tool and lacked any compliance measures as an enforceable policy.

5.2.2.6 Energy Facilities (11 AAC 112.230)

Changes made to the Energy Facilities policies include (1) revising the basis for siting and approving major energy facilities from on the basis of "to the extent feasible and prudent," to "to the extent practicable," (*See* discussion above at 5.1.2.3 for definition of practicable); (2) removing the term, " in productive habitat" from the end of the standard "select sites where development will require minimal site clearing, dredging and construction;" (3) entirely removing the standard of "selecting sites in areas which are designated for industrial purposes and where industrial traffic is minimized through population centers;" and (4) further defining "uses authorized by the issuance of State and federal leases for mineral and petroleum resource extraction" to include easements, contracts, rights-of-way, or permits for mineral and petroleum resource extraction.

5.2.2.7 Utility Routes and Facilities (11 AAC 112.240)

Utility routes and facilities were separated from transportation routes and facilities. In addition, the standard was revised to take into consideration "water related" utility routes and

facilities (originally it was only water dependent), and exchange the standard "feasible and prudent inland alternatives" with "practicable inland alternatives."

5.2.2.8 Timber Harvest and Processing (11 AAC 112.250)

No substantive changes were made to this section. This section will not be reviewed for impacts.

5.2.2.9 Sand and Gravel Extraction (11 AAC 112.260)

The State has removed all references to mining in its coastal policies. Previously, the coastal policies were not very explicit with respect to mining and mineral processing. The requirement simply stated that, "[m]ining and mineral processing in the coastal area must be regulated, designed, and conducted so as to be compatible with the standards contained in this chapter, adjacent uses and activities, statewide and national needs, and district programs." With the removal of any reference, the State's position is that activities associated with and conducted by mining can be adequately regulated under the other statewide standards and other State and federal laws.

With respect to sand and gravel, there are two changes. First, while sand and gravel may still be extracted in coastal waters and be covered by ACMP review, the definition of "coastal waters" has been revised (*See* section 5.1.2.1 above). This revision could result in sand and gravel extraction activities now taking place in the coastal areas along stream banks and rivers, where the water does not meet the "coastal water" standard. In addition, Alaska has revised the standard from "no feasible and prudent alternative" to "no practicable alternative."

5.2.2.10 Subsistence (11 AAC 112.270)

Alaska has revised the Subsistence standard. The pre-existing policy required that State agencies and districts recognize and assure opportunities for subsistence usage of coastal areas and resources. The State viewed this policy as overly broad and unclear and removed this requirement. Under 11 AAC 114.250, districts may now designate subsistence areas in which "a subsistence use is an important use of coastal resources." Previously districts identified areas where subsistence was a "dominant use of coastal resources," and had a "priority over all nonsubsistence uses and activities." In addition, previously, before a potentially conflicting use or activity was authorized in a designated subsistence area, a study of possible adverse impact and appropriate safeguards to assure subsistence usage was required. Under the new standard, a project applicant must submit an analysis or evaluation of reasonably foreseeable adverse impacts of the project on subsistence use, and that project "must avoid or minimize impacts to subsistence."

5.2.2.11 Transportation Routes/Facilities (11 AAC 112.280)

This section is new, having been added primarily to separate and distinguish it from utility routes and facilities. The language now requires that all transportation routes and

facilities must "avoid, minimize, or mitigate" alterations in surface and ground water drainage patterns, disruption in known or reasonably foreseeable wildlife transit and blockage of existing or traditional access. "Transportation routes and facilities" is defined at 11 AAC 112.990(28) as "natural transportation routes dictated by geography or oceanography, roads, highways, railways, air terminals, and facilities required to operate and maintain the route or facility.

5.2.2.12 Habitats (11 AAC 112.300)

The State made several significant changes to the habitats standards. The State removed the introductory language to the section requiring that each type of habitat be managed to "maintain or enhance the biological, physical, and chemical characteristics of the habitat which contribute to its capacity to support living resources." The State rewrote the standards habitat so that, with the exception of rocky islands and seacliffs and barrier islands and lagoons, each type will now be managed for a more limited list of habitat values. However, a particular habitat receives more holistic review if it is designated an "important habitat." Discussion of the various changes is broken down by section, below.

5.2.2.12.1 Offshore Areas

Offshore areas are now managed to "avoid, minimize, or mitigate significant adverse impacts to competing uses such as commercial, recreational, or subsistence fishing, to the extent that those uses are determined to be in competition with the proposed use." Previously, in addition to being managed to maintain or enhance their habitat qualities, they were also to be managed as fisheries conservation zones.

5.2.2.12.2 Estuaries

Estuaries under the new standards are now to be managed to avoid, minimize, or mitigate significant adverse impacts to adequate water flow and natural water circulation patterns and competing fishing purposes. Under the previous standard, estuaries were also managed to assure adequate water flow, natural circulation patterns, nutrients and oxygen levels, avoiding the discharge of toxic wastes, silt, and the destruction of productive habitat. Nutrients and oxygen levels, discharge of toxic substances, and activity-induced siltation are covered under the statutory and regulatory authority of DEC.

5.2.2.12.3 Wetlands

The new wetland standards require that wetlands be managed to avoid, minimize, or mitigate significant adverse impacts to water flow and natural drainage patterns. Under the previous standard, wetlands (along with tide flats) were managed to assure adequate water flow, nutrients, and oxygen levels, and avoid adverse effects on natural drainage patterns, the destruction of important habitat, and the discharge of toxic substances. Nutrients and oxygen levels and the discharge of toxic substances are covered under the statutory and regulatory authority of DEC.

Alaska has revised the definition of both saltwater and freshwater wetlands. The new definition for wetlands is found at 11 AAC 112.990(33): "'wetlands' means saltwater wetlands and those freshwater wetlands that have a direct drainage to coastal waters." While freshwater wetlands are further defined at 11 AAC 112.990(13) in terms of vegetation and environment," the most significant change is in section AAC 112.990 (33) where wetlands are to drain into coastal waters. The term "coastal waters" has been redefined to mean waters "contain[ing] a measurable quantity or percentage of sea water."

5.2.2.12.4 Tide flats

Tide flats were previously managed under the same standard as wetlands. Under the new standards, they are now managed to avoid, minimize, or mitigate adverse impacts to water flow and natural drainage patterns, as well as competing commercial, recreational, or subsistence uses, to the extent that those uses are determined to be in competition with the proposed use.

5.2.2.12.5 Rocky Islands and Sea Cliffs

Under the new standard, rocky islands and sea cliffs are now managed to avoid, minimize, or mitigate significant adverse impacts to habitat used by coastal species, and avoid the introduction of competing or destructive species and predators. This is very similar to the previous standard, which was avoiding the harassment of wildlife, destruction of important habitat, and the introduction of competing or destructive species and predators. This does not seem to be a major change and this standard will not be reviewed for impacts.

5.2.2.12.6 Barrier Islands and Lagoons

The new standard echoes the previous standard, requiring that barrier islands and lagoons be managed to avoid, minimize, or mitigate significant adverse impacts to (rather than maintain) adequate flows of sediments, detritus, and water, avoid the alteration or redirection of wave energy which would lead to the filling in of lagoons or the erosion of barrier islands, and discourage activities which would decrease the use of barrier islands by coastal species, including polar bears and nesting birds. This does not seem to be a major change and this standard will not be reviewed for impacts.

5.2.2.12.7 Exposed High-Energy Coasts

The new standard for managing these habitats includes avoiding, minimizing, or mitigating significant adverse impacts to the mix and transport of sediments and the redirection of transport processes and wave energy. The new standard does not address the mix and transport of nutrients.

5.2.2.12.8 River, Stream and Lakes

The purpose of the new standard is to manage to avoid, minimize, or mitigate significant

adverse impacts to natural water flow, active floodplains, and natural vegetation within riparian management areas. Under the original standards, river, streams and lakes were also managed to protect water quality and important fish or wildlife habitat.

5.2.2.12.9 Important Habitat (11 AAC 250(h))

The new standard now incorporates a category called "important habitat," replacing "important upland habitat" (*See* section 5.1.2.12.10). Under the program changes, "important habitat" refers to any of the types of habitat discussed above, or another area which has been designated by either a district or the State, or State game refuges, State game sanctuaries, State range areas, or fish and game critical habitat areas. The area must be managed for the "special productivity of the habitat" in accordance with district enforceable policies, if it has been designated by a district as "important habitat," or managed to avoid, minimize, or mitigate significant adverse impacts to the special productivity of the habitat. In order for an important habitat to be designated, either a district or the State can demonstrate that (1) the use of those designated portions have a direct and significant impact on coastal water; and (2) the designated portions are shown by written scientific evidence to be biologically and significantly productive.

5.2.2.12.10 Removal of "Important Upland Habitat"

Alaska has removed "important upland habitat" as one of the habitats in the coastal area which is subject to the ACMP. Important upland habitat is defined at 6 AAC 80.900(15) as "drainages, aquifers, and land, the use of which would have a direct and significant impact on coastal water." Instead, DNR states that upland habitat which would have a direct and significant impact on coastal water could still be addressed through the newly included "important habitat." Other State and federal laws continued to address upland habitats as well.

5.2.2.12.11 Riparian Management Areas and Floodplain (11 AAC 112.300(c)2) and 11 AAC 112.990 (1)

Alaska has incorporated definitions for riparian management areas and floodplains which it will use to delineate areas alongside rivers, lakes and streams subject to the program's review.

Previously, the ACMP did not have any definitions for riparian management areas and floodplains. It is standard practice for a state to delineate or define such areas in its coastal policies.

5.2.2.13 Historic, Prehistoric, and Archaeological Resources (11 AAC 112.320)

There are two changes under the new standard. First, DNR, which includes OPMP and the State Historic Preservation Office, rather than "appropriate State agencies" is identified as the State agency to designate historic, prehistoric and archeological resource sites in the State. Second, the language was changed to be more specific from designating these sites in the "State"

to designating them in the "coastal zone." These are not major changes and this section will not be reviewed for impacts.

5.2.2.14 Avoidance, Minimization, or Mitigation (11 AAC 112.900)

Alaska has adopted a new standard throughout the regulations for "avoidance, minimization or mitigation." It specifically appears in the standard for utility routes and facilities, transportation routes and facilities, and habitats. The State has clarified in its program submission that it is not their intent for this standard to be equated with "no net loss of coastal resources."

5.2.3 HB 191, 11 AAC 114 – District Plan Guidance

The changes to the regulations at 11 AAC 114 primarily address the requirements for district plan contents and the transition process as per HB 191. Below is a detailed description of the revisions that have been made to the guidance, compared against the existing approved ACMP guidance.

5.2.3.1 Government Process 11 AAC 114.010 – 11 AAC 114.020

There are two elements covered under this section: (1) public participation and information; and (2) program management and coordination. As explained in Section 5.4, no substantive changes were made to the public participation and information requirements in the ACMP. However, significant changes were made to program management and coordination.

Under EO 106 and HB 191, the ACMP was relocated from the DGC in the Governor's Office into the OPMP within the DNR, and the Alaska CPC was dissolved. The role of the CPC was to provide policy-level leadership for the ACMP, and to serve as the main coordination mechanism for the ACMP, as well as the repository of most of the authority for the program. Since the ACMP was originally intended to be based on both State agency and local authorities, the CPC membership was composed of representatives of both groups. There were nine elected local government officials and seven State agency heads on the CPC. The CPC was responsible for adopting the ACMP regulations, supporting resolutions, participating and advising the development of grant applications for federal funding to support the ACMP, reviewing and approving district plans, and providing general leadership for the ACMP. In addition, the CPC served as a forum for resolution of disputes that might arise between State agencies and local governments on local program implementation, and played a conflict resolution role in inter-agency conflicts when possible. These responsibilities have now been transferred to DNR, which has professional community planning and public policy development responsibility and experience. While there continues to be public notice and opportunity for input during public comment and public hearing procedures, there is no longer the same level of participation and local representation at the policy and decision-making level on development of State coastal program standards and guidance, nor approval of district plans.

5.2.3.2 Plan Elements (11 AAC 114.200 – 11 AAC 114.290)

Perhaps the most significant changes to the ACMP have been to the district plan development and implementation process. As explained by the Alaska State legislature in the Findings section of HB 191, the purpose of the legislative changes to the ACMP was to make the ACMP "function with a minimum of delay and avoid regulatory confusion, costly litigation, and uncertainty regarding the feasibility of new investment." It was their decision to:

> [U]pdate and reform the existing statewide standards of the ACMP so that they are clear and concise and provide needed predictability as to the applicability, scope, and timing of the consistency review process under the program [and]...update and reform the district coastal management plans under the ACMP so that the local enforceable policies within those plans are clear and concise, provide greater uniformity in coastal management throughout the State, relate to matters of local concern, and do not duplicate State and federal requirements.

Consequently, the State developed local district guidance and a process to significantly revise the existing district coastal plans. A description of the changes is provided below, with comparisons to the previously approved guidance and process where possible.

5.2.3.2.1 Coastal Zone Boundaries (11 AAC 114.220)

Although Alaska's coastal zone boundary remains the same, the new definition of "coastal waters" limits the application of certain policies within that boundary. In describing the coastal zone boundary, the regulations read, "[f]inal coastal zone boundaries may diverge from the initial boundaries so long as the final boundaries (1) extend inland and seaward to the extent necessary to manage a use or an activity that has or is likely to have a direct and significant impact on coastal waters." Since the new definition limits 'coastal waters' to a much smaller area, the State's standards related to coastal access, sand and gravel extraction, important habitats, rivers, streams and lakes, and freshwater wetlands will also now apply to a more limited area. The change in the boundary language itself does not affect the designation of the State or a district's boundary, since the original boundary language reads, "extend inland and seaward to the extent necessary to manage a use or an activity that has or is likely to have a direct and significant impact on ***marine*** coastal water." As discussed above at 5.1.2.1, the new definition of 'coastal waters' and the existing definition of 'marine coastal waters' are the same.

5.2.3.2.2 Resource Inventory and Resource Analysis (11 AAC 114.230–240)

Since it is the legislation's overall goal to restrict the scope of district policies to resources that are of local concern, and neither repeat nor duplicate any existing federal or State requirements, the new resource inventory and analysis requirements are much more rigorous and focused. The new language states the "resources subject to a district plan are ***limited***" (italics added) to a descriptive list of characteristics, which are identified in other parts of the regulations, and which require additional, restrictive delineation. The purpose of any of the new areas listed for inclusion in the inventory is because if these areas are not listed in a district's

plan for a particular use, then the district will not be able to develop policies relating to that area for that specific use. In addition, districts must now incorporate "appropriate and pertinent local knowledge," and resource inventory information must be substantiated or documented with a citation or reference to the source of information. If the information is included by reference, it must be summarized and made available upon request. The previous guidance for district plan inventories had no information substantiation requirements.

The new resource analysis guidance is similar to the resource inventory requirements. In addition to previous resource analysis requirements, the State now requires districts to provide information on "reasonably foreseeable direct and indirect impacts" of uses and activities. Districts must also document "by local usage or scientific evidence a use or resource of unique concern that is the subject of an enforceable policy" for an area designated by a district as a land and water use or activity subject to the district's plan, a SAMP, or an area that merits special attention within a district.

The new guidance for the resource inventory and analysis introduces several new terms requirements that previously were not part of developing a district plan resource inventory and analysis. These include "appropriate and pertinent local knowledge," "scientific evidence," and "local usage." These are described below.

- "Appropriate and pertinent local knowledge" defines the type and extent of local knowledge that can be cited in a district's inventory as that which is relevant and useful; i.e., "a body of knowledge or information about the coastal environment or the human use of that environment, including information passed down through generations, if that information is (a) derived from experience and observations; and (b) generally accepted by the local community;

- "Scientific evidence" means facts or data that are (1) premised upon established chemical, physical, biological, or ecosystem management principles as obtained through scientific method and submitted to OPMP to furnish proof of a matter; (2) in a form that would allow resource agency review for scientific merit; and (3) supported by one or more of the following: (i) written analysis based on field observation and professional judgment along with photographic documentation; (ii) written analysis from a professional scientist with expertise in the specific discipline; or (iii) site-specific scientific research that may include peer-review level research or literature.

- "Local usage" means current and actual use of a coastal resource by residents of the locality in which the resource is found. This definition would require proof, but not of the rigorous nature entailed by having to provide "scientific evidence" of the use.

5.2.3.2.3 Subject Uses, Activities, Resources, and Designations (11 AAC 114.250)

This section defines the subject matter under which district enforceable policy matters may be written, and specifically lists the subject matter and criteria for establishing designated areas. A district may write district enforceable policies on any or all of the uses, activities, and resources listed in 11 AAC 112.200 – 11 AAC 112.240 (coastal development, natural hazard areas, coastal access, energy facilities, and utility routes/facilities), and 11 AAC 112.260 – 11 AAC.280 (sand and gravel extraction, subsistence, and transportation routes and facilities), as well as uses, activities and resources in 11 AAC 114.250 (b)–(i) (natural hazards areas, recreation use areas, areas of tourism, major energy facility sites, commercial fishing/seafood processing facility areas, subsistence areas, any of the habitat and important habitat areas, and historical/ prehistorical areas). However, if a district wants to write an enforceable policy for one of the eight areas listed in 11 AAC 114.250 (b)–(i), that area must be designated. In addition, if a district creates an enforceable policy for a matter in a designated area, the policy is applied outside of the boundaries of that designated area, pursuant to 11 AAC 110.015. Under 11 AAC 110.015, State and approved district enforceable policies will apply to federal actions affecting Alaska's coastal uses or resources, regardless of the location of the federal action where the coastal use or resource is affected. This section shall apply notwithstanding language limiting the application of district policies to geographic areas in other sections of Alaska's regulations.

Under the previous district programs, districts were required and encouraged to designate specific areas in order to be able to apply their policies, but were not necessarily restricted to applying district policies within the boundaries of those designated areas. This restriction, as contained in 11 AAC 110.015, may reduce districts' abilities to apply their enforceable policies to non-federal actions that may have impacts on coastal resources, particularly along district and designated area boundary lines.

5.2.3.2.4 Proper and Improper Uses and Activities (11 AAC 114.260)

This section has not changed substantively, however, because of the importance of designating areas with respect to development and application of district policies in designated areas, Areas which Merit Special Attention, and special area management plans, the opportunity to identify proper and improper uses and activities is more critical.

5.2.3.2.5 District Enforceable Policies (11 AAC 114.270)

Both the legislation and the revised regulations are clear in their intent to significantly revise district policies. The original regulation at 6 AAC 85.090 was broad in its description of requirements for policies (e.g., criteria required that policies be comprehensive, so as to apply to all uses, activities and areas in need of management; and specific so as to allow clear understanding of who will be affected by the district program; and enforceable). However, the new requirements are more specific and focused:

(1) The policies must relate to the uses and practices identified in the regulations (*See* 5.1.3.2.3 above);

(2) District enforceable policies may not address any matters regulated by DEC, including policies that are more or less stringent than a DEC standard on a regulated subject area;

(3) District policies may not adopt, duplicate, repeat, restate, or incorporate by reference a State standard or other State or federal law;

(4) If the policy addresses a subject matter regulated or authorized by State or federal law, then it must relate to a "matter of local concern." In order to identify a "matter of local concern," the district must have it documented in its plan. Furthermore, a "matter of local concern" must:

- relate to a specific coastal use or resource within a defined portion of the district's coastal zone, typically identified in the resource inventory;
- relate to an area defined narratively or mapped;
- relate to a coastal use or resource that is sensitive to development;
- address a coastal use or resource that is not adequate addressed by State or federal law;
- relate to a coastal use or resource that is of unique concern to the district through documentation of local usage or scientific evidence

(5) The policy must be clear and concise as to the activities and persons affected by its requirements, and use precise, prescriptive and enforceable language. Either the policy or the implementation chapter must clearly explain how to implement the policy, who implements it, who enforces it, and who has the expertise in determining compliance with the policy. In addition, the policy must use objective language;

(6) The policy must be supported by the resource inventory and analysis;

(7) A district plan must have at least one policy that can be applied to the designated area during consistency review, since a policy that only provides a designation does not have an enforceable component, and policies must be enforceable; and

(8) A district can reference a State standard to build on it, but can not incorporate it by reference, or repeat it.

Essentially, the districts were formerly able to write a district policy on almost any use or resource anywhere in their districts, regardless of whether the subject use or resource of the enforceable policy were present within the district, or already covered/addressed by another State or federal law. The program changes have focused the districts to writing policies for areas that have already been designated for a specific use, and uses that are not already sufficiently managed by either DEC, or if managed by another State or federal agency, are of local concern. In addition, new requirements for scientific and local knowledge are required at several stages of development of a district's plan. Such scientific and local knowledge is needed to support any

one policy, resource inventories and analyses, and demonstrating that the issue is a matter of local of concern. This last item also requires a demonstration that the issue is not already sufficiently managed by a State or federal agency policy, and is of local concern. In addition, the State has established standards for what is acceptable as scientific and local knowledge documentation.

5.2.3.2.6 Implementation (11 AAC 114.280)

This section of the regulations was not substantially revised. Additional descriptive information is now required on the planning, implementation, and enforcement relationships between the coastal district and the cities and villages inside the districts, however, this does not appear to be a significant change and this section will not be reviewed for impacts.

5.2.3.3 Plan Review Process (11 AAC 114.300 – 11 AAC 114.385)

The changes that were made to the plan review process regulations primarily reflect technical amendments to the program; i.e., the relocation of the ACMP into DNR, OPMP's assumption of the former CPC's responsibility for district plan review and approval. The new sections identify the district plan development and approval process for new and amended district plans, including the public review requirements, the minor amendment process for revisions to district plans that are not significant amendments, procedures for mediation on plan approval, federal review, local adoption and effective dates, reporting, new requirements for submission of district plans (every ten years), and petitions for amendments to district plans or regarding non-implementation of district plans. The only new requirements are that districts review and submit their plans every ten years, and the inclusion of the transition process to address the
implementation of the new district plans required under the new statutes and regulations. The new regulations are detailed, however the changes are procedural, and not considered significant in terms of effects.

5.2.3.4 Special Area Management Plans and Areas Which Merit Special Attention (11 AAC 114.400 – 11 AAAC 114.430)

There are no structural changes to Special Area Management Plans (SAMPs) and Areas which Merit Special Attention (AMSAs) planning criteria. However, all currently approved SAMPs and AMSAs developed by district/borough programs must be revised, along with district plans, as of March 1, 2007, according to the new procedures proscribed for district program under 11 AAC 114.

5.2.3.5 General Provisions (11 AAC 114.900 – 11 AAC 114.990)

In this section, the State has made numerous additions and a few changes and deletions to definitions in the ACMP that reflect the revisions to the statutes and regulations. Some of the additions include definitions for 'local usage,' 'major energy facility,' 'matter of local concern,' 'reasonably foreseeable,' 'scientific evidence,' and 'use of State concern.' An example of a definition that was changed is the term 'coastal water,' (*See* discussion above). In other instances, definitions that are no longer relevant have been removed, such as 'Council.' Most of these additions, changes and deletions have been mentioned in the related discussions of revisions to statutes and regulations above. The impacts of any changes will be discussed in the context of the appropriate impact sections, and will not require separate analysis.

5.3 HB 69

The State made revisions to the ACMP's statues relating to the regulation of shallow natural gas resources. These include:

(1) For certain actions involving exploration for or development of shallow natural gas at a single well or a single field, the Alaska Oil and Gas Conservation Commission (AOGCC) may, where operations might be unduly delayed, approve a variance from the AOGCC's regulations that apply to the well or field;

(2) The DNR commissioner may approve a waiver of local planning authority approval and requirements relating to compliance with local ordinances and regulations;

(3) The addition of "production facilities" used solely to explore for or "develop or produce shallow natural gas resources" to the exemption from the requirement to obtain an approved oil discharge prevention and contingency plan unless the AOGCC determines otherwise; and

(4) All shallow natural gas exploration and development activities that are conducted under the oversight and regulation of the AOGCC and the State's resource agencies are automatically determined to be consistent with the ACMP.

5.4 HB 86

HB 86, Section 3 eliminates the ability of third parties (anyone other than the applicant or a coastal resources district) to file a lawsuits against OPMP/ACMP on a final consistency determination. The effects of this provision are discussed in section 7.3 as part of the federal consistency changes discussion.

The second provision, Section 4, provides that certain oil and gas projects in the Cook Inlet Basin are authorized and approved by the legislature, and also provides for an exemption from judicial review similar to Section 3 of HB 86. The State is not submitting Section 4 as an amendment to the ACMP, and therefore it will not be reviewed in this NEPA analysis. Alaska's submittal states that Section 4 is not an amendment to the ACMP because the projects at issue

had already received the required consistency determinations, and subsequent judicial review was not a factor in OCRM's original program approval or a requirement of the CZMA.

5.5 SB 102

On May 26, 2005 the Governor signed into law SB 102, in part to address the sunset provision on the ACMP that annulled the statewide ACMP standard as of July 1, 2005, and extended by eight months the effective authority of existing district coastal management programs and the deadline for districts to submit their revised plans to DNR to March 1, 2007. Other elements of SB 102 (1) automatically repeal the ACMP by removing all references to the ACMP from statutes, which will require the State legislature to conduct a mandatory review of the ACMP's efficacy on a given date after the program, its coastal district plans, and the ABC List revisions have been approved and implemented; (2) repeal district enforceable policies that are in conflict with State law; (3) mandate that within two years after OCRM approval of this program amendment DNR review and update all categorically consistent or generally consistent ACMP approvals; and (4) specify that if the ACMP, as amended, is not approved in a "timely" manner by OCRM (e.g., January 1, 2006), then the ACMP will sunset on May 10, 2006.

6. AFFECTED ENVIRONMENT

The "Affected Environment" section was written to capture the widest possible universe of possibly affected environments and socio-economic considerations. The inclusion of sections therein does not mean that the subject matter is necessarily anticipated to be actually affected by all of the statutory changes within Alaska's program change submittal, including EO 106, HBs 69, 86, 191, SB 102, changes to statute 46, and regulation changes within 11 AAC 110, 11 AAC 112, and 11 AAC 114. Several of the sections below provide an overall background describing Alaska's coastal environmental and socio-economic character. In particular, for each listing of sub-groupings within the "Affected Environment" section, we have attempted to provide a reasonably comprehensive list of environments, and issues related to such environments. These listings are intended to be representative samplings of potentially impacted species, biota, languages, economic categorizations, and social categorizations, and are not intended to be complete and exhaustive.

6.1 Physical Environment

The amendments to the ACMP will affect the entire coastal area of Alaska; a vast expanse. Alaska sprawls longitudinally approximately 2,400 miles across the North Pacific Ocean. Its westernmost chain of islands extends so far westward that the International Date Line tacks to keep Alaska on the same date. Alaska includes the western and northernmost points of land in North America and spans 1,420 miles from south to north. Even distances of this magnitude do little to illustrate the length of Alaska's coastline. It is the only State bounded by two oceans and two seas. Glaciers have carved many large islands from the mainland and retreated to uncover a shoreline with abundant narrow fjords and craggy headlands. Volcanic activity has formed numerous islands. As a result of its convoluted coastline and its vast extent, the marine shoreline of Alaska measures 44,500 miles (note: the original ACMP document

identified the coastal shoreline mileage as 33,904 miles, however, recent Alaska coastline GIS surveys using updated technology indicate the higher number). This is more than two-thirds the total marine shoreline of the United States and its possessions.

The ice-stressed coastal ecosystems of Alaska are unique in the United States, although its diverse coastline includes every ecosystem found in the contiguous states except tropical. Alaska's fertile continental shelf totals 830,000 square miles, or 74 percent of the nation's total. It is an important continental interface between Asian and North American biotic and human communities. There are species and subspecies indigenous to Alaska alone. Many species of migratory fish, birds, and marine mammals use the islands, estuaries and coastal streams and ponds for breeding, spawning, birthing and resting. Some of the world's richest commercial fish stocks are found along Alaska's continental shelf.

The unique biophysical character of Alaska's coastal zone is of extreme national and international scientific and economic value. Its potential oil and gas reserves are among the largest in the world. Nearly all of the minerals classified as strategic by the Federal government, ranging from antimony to zinc, are found in Alaska.

Many of these diverse uses of the coastal zone are conflicting. Opportunities to preserve sections of the coastal zone for future recreation, education, scientific study, and conservation are without equal in the United States. Conversely, opportunities to develop the wealth of coastal resources such as oil and gas, mineral, fish and timber are also without equal. The ACMP seeks to strike a balance between conserving and developing the wild and rich coastal resources of Alaska.

6.1.1 Climate

In Alaska, climatic extremes are the primary factor in determining the location and intensity of fish, wildlife and human activities in the coastal zone. The geographic breadth of the State results in radically different climates found along its coasts. These climatic conditions also depend on the season, the topography and the different characteristics of the surrounding seas. The three major coastal climatic zones in Alaska are maritime, transition, and arctic.

The maritime climate is found in Southeast Alaska, the Aleutian Island chain, and the narrow coastal strip in between. The Pacific Ocean is the major moderating influence. This climatic zone is characterized by cool summers and mild winters. The average annual temperature is approximately 40° Farenheit (F) in Southeast Alaska and is slightly cooler in the Aleutians. Cloudy skies occur approximately 275 days per year, with rain or snow on 220 to 230 days. Average annual precipitation is about 90 inches in Southeast Alaska, but ranges from 26 inches near Skagway to over 360 inches on Baranof Island. In Southeast Alaska there are 111 to 208 frost-free days per year.

Between maritime and the extensive continental climatic zone lies the transition zone. This zone includes the coasts of the northern Gulf of Alaska, western Alaska, and the Alaska

Peninsula. Along the Pacific coast the transition zone is narrow. It is a highly variable climatic region being overwhelmed alternately by maritime and continental conditions. The ocean has much less influence on climate along the western coast of Alaska. The transition zone generally has more marked temperature variation, less cloudiness, and less precipitation than is characteristic of the maritime climate. Mean annual temperatures range between 29 degrees F in northwestern Alaska to 39 degrees F in south-central Alaska. Precipitation generally ranges from less than 12 inches per year in the north to about 60 inches in the south.

The north slope of Alaska is in the arctic climate zone. At Point Barrow the sun stays below the horizon for 67 days and above the horizon 80 days each year. A persistent frozen condition dominates the climate. Predictably, winters are long and cold, and summers short and cool. The mean annual temperature is about 17 degrees F and annual precipitation is from less than four inches (at Barrow) to about 17 inches per year, 60 percent of which is snow.

6.1.2 Natural Hazards

An inventory of Alaska's coastal natural hazards is long and varied. Most of the coastal hazards are common in other state coastal zones, but in Alaska they are often more widespread or extreme than those experienced in more temperate regions. Some natural hazards are instigated by human disturbance of natural conditions or processes. This problem is magnified in Alaska
because of the fragile nature of much of the coastal environment. However, the overall problem is ameliorated because much of the coastal environment is in restricted or no-development status due to federal ownership and accompanying federal land use plans.

6.1.2.1 Strong Winds and Storms

Strong winds and storms are common throughout the Alaska coastal zone. Broad storm tracks move up the Aleutians into the northern Gulf of Alaska throughout the year, with winds occasionally reaching 75 to over 100 miles per hour (mph). In the mountainous coastline bordering the Pacific Ocean, narrow passes funnel winter winds into dangerous gusts that can continue for weeks. Violent storms often arise with very little warning. In western Alaska, summer storms of gale force are common and even cyclonic storms frequent the Aleutian Islands where winds average 17 to 20 mph year-round. Shemya Island, for example, experiences calm conditions only about nine days of the year.

Visibility is greatly reduced in many areas by ubiquitous torrential rains, blizzards, and fogs. An extreme blizzard condition known as a "white-out" can reduce visibility in winter months to zero.

6.1.2.2 Tidal Extremes

Navigation is limited by numerous and uncharted sand bars, reefs, and rocky islets, and the severe weather conditions noted above. The extreme tidal ranges in south central and southeast Alaska affect all water related activities, especially marine transportation, marinas,

docks, waterfront businesses, log dumping or storage, shoreline construction and the location of recreational facilities. Tidal currents as strong as six knots are not uncommon in narrow southeastern straits.

6.1.2.3 Erosion

Alaska's coastline and rivers are often subject to periodic, yet severe, erosion. The northern coastline is icebound for most of the year. The ice season lasts from November to April on most of the Bering Sea coast, longer along the Chukchi Sea, and still longer on the Beaufort Sea coast, where it usually lasts nine to ten months. Along this northern coastline, Alaska experiences some of the highest erosion rates in the world during its few ice free months. The high coastal erosion rates generally are caused by seasonal storm surges, the thawing of permafrost, and the breaking off of chunks of shoreline by moving ice. Some of the area's barrier islands are moving landward at a rate of 23 feet per year.

While the overall average rate of erosion along Alaska's coastline is eight feet per year, specific area erosion rates can be significant and negatively impact a large number of coastal communities. In 1975, a State committee identified 35 communities where erosion was considered critical. The number of communities with known erosion problems increased to 62 in a 1984 State task force report. For instance, the Matanuska River has in the past cut as much as 90 feet of riverbank in four days. Some communities lose 10-20 feet of riverbank annually. In some places, the whole community is threatened by erosion. The majority of the coastal bluff properties within the City of Homer are threatened due to chronic coastal erosion. The Homer Spit has significant erosion, an impact from the 1964 earthquake. Because the plate dropped about three feet, the entire perimeter of land adjacent to Homer is washing to sea. The village of Newtok recently completed a Congressionally-approved land trade to relocate off a severely eroding river bank to the north end of Nelson Island. The coastal village of Shishmaref may have to relocate because it is affected by coastal erosion from strong fall storms before the sea is frozen

over. Other Alaskan coastal communities including Barrow, Kivalina, Newtok and Point Hope are also looking at relocation as a possibility due to severe coastal erosion. (http://www.surfrider.org/stateofthebeach/05-sr/state.asp)

6.1.2.4 Earthquakes and Tsunamis

The coastal strip between Cordova and the tip of the Aleutian chain is classified as one of the two highest seismic risk areas in the United States. The 1964 Good Friday earthquake, which registered about 8.5 on the Richter Scale, caused notable tectonic changes in land level over a 70,000 to 110,000 square mile area. The area of crystal deformation is larger than any such area known to have been associated with a single earthquake in historic times. Maximum subsidence was 7.5 feet; maximum measured uplift was 38 feet. Subsea lifting may have been as great as 50 percent.

The resulting tsunami, another natural hazard, destroyed portions of the three major towns and part or all of numerous small villages in Alaska as well as causing deaths along the West Coast. The seismic sea wave was still four feet high when it washed up on Antarctica less than 24 hours later. Five Alaska communities (Sitka, Yakutat, Unalaska, Dutch Harbor and Adak) have recorded nine or more catastrophic tsunamis.

About 48 volcanic centers in a 1,500 mile coastal arc from Cook Inlet through the Aleutians have been reported active since 1760. Earthquakes and tsunamis are well-known, but equally hazardous to human life and property, are high-speed mud slides and flash floods from glacier-dammed lakes which are suddenly released, both of which can extend many miles. Corrosive acidic rains are common after eruptions and can also fall hundreds of miles from their origin. More recently, volcanic ash from coastal volcanoes near Anchorage temporarily shut down local air travel and rerouted international air routes.

6.1.2.5 Hydrologic and Geological Features

Surging ice is another coastal hazard in Alaska. In the Beaufort Sea, oceanographic and meteorological influences maintain the summer arctic ice pack in a position almost always threatening, if not halting, navigation. In winter the pack ice reaches Bristol Bay regularly, sometimes advancing as far the eastern Aleutian Islands and covering the entire Bering Sea Continental Shelf. Surging glaciers are an uncommon but potential threat in southern and southeastern Alaska. The gravelly soils of flat, glacier valleys are inviting sites for construction, but occasionally a glacier will surge without warning. The inland Black Rapids Glacier is an example. Advancing up to 62 meters per day in 1936-37, the terminal moraine nearly blocked the only road link between Anchorage and Fairbanks before the glacier began to recede. A more recent example is near Yakutat Bay where the Russell Fjord was temporarily closed by a surging glacier. Several studies have been started to determine if the world famous Situk River can be saved in the event Russell Fjord is again block and then overflows directly to the Gulf of Alaska. Icebergs, split away from the seasonal ice pack or calved from tidewater glaciers in south central

and southeastern Alaska, can threaten coastal navigation by oil tankers in Prince William Sound as well as large and small cruise ships and pleasure boats.

In Alaska, vastness itself is a natural hazard. With isolated small communities, dependant upon air and marine transportation services along immense reaches of coastline, even a minor accident can prove to be dangerous. The layer of permafrost on the arctic and western coast of Alaska is a unique natural hazard aggravated by human disturbance. The persistently frozen ground prevents internal soil drainage, forcing water to drain over the surface and accumulate in peaty bogs. Because it is impermeable, permafrost hinders development and maintenance of community utilities including roads, airports, and water and sanitation devices.

Landslides are particularly common along the southern and southeastern coasts because of steep slopes and unstable soils. Snow avalanches are frequent in the spring. Both pose potential threats to roads, above ground utilities, homes and businesses. Landslides may be instigated by the removal of vegetation by the construction or timber industries. Less

spectacular erosion is initiated by placer mining, overgrazing, agriculture and the use of vehicles on permafrost soils. Solifluction is a peculiar "landslide" occurring in thawed soils underlain by permafrost. In the past, erosion was initiated by large scale hydraulic and dredge mining for placer gold. Because of the northern climate, overgrazing and farming have not been significant contributors to erosion. Conversely, cross country all terrain vehicle use continues to be a potential local source of erosion.

Irregular subsidence, caused by the thawing of frozen soils beneath disturbed vegetation, severely curtails development and land uses in the arctic. A more widespread subsidence problem may follow the removal of oil and gas reserves in the arctic.

6.1.2.6 Sea Level Rise

Sea level rise is another issue facing Alaska. The EPA's global warming impacts website notes that over the last century, the average temperature in Anchorage, Alaska, has increased 3.9 degrees F, and over the last 41 years of available date, precipitation has increased by approximately 10 percent in many parts of the State. These past trends may or may not continue into the future. Sea level rise could lead to flooding of low-lying property, loss of coastal wetlands, erosion of beaches, saltwater contamination of drinking water, and decreased longevity of low-lying roads, causeways, and bridges. In addition, sea level rise could increase the vulnerability of coastal areas to storms and associated flooding. Much of Alaska's coast remains undeveloped; however 85 percent of the State's population resides in the coastal area, with 40 percent of that population currently residing in the coastal city of Anchorage alone. Rising sea levels would also increase the intertidal and estuarine coastal habitats with slight topographic relief such as the Yukon Delta National Wildlife Refuge.

Clearly several factors contribute to the changes in Alaska. Current rates of erosion of Alaska's coastline vary widely because of local terrain and differences in the rates of uplift, as well as the abundance of sea ice and permafrost. In some areas, uplift as a result of tectonic activity is rapid. On average, however, Alaska's coastline is eroding at a rate of eight feet per year, and this rate could increase with sea level rise. Along much of Alaska's coast, the rate of sea level rise is nearly equal to or less than the rate of uplift. Accounting for the effects of climate change, sea level may rise a total of ten inches by 2100, although at some locations a net uplift is most likely.

6.1.3 Marine Ecosystems

The ACMP covers non-federally owned intertidal and marine waters extending seaward three miles from the shoreline. There are six major ecosystems represented in the Alaskan coastal zone. The nearshore and intertidal ecosystems are wave-beaten coast, fjord estuary, tide-mixed estuary, ice-affected Bering Sea coast and the ice-affected Arctic Ocean coast. Offshore is the vast continental shelf of Alaska. Almost all of the wave-beaten coasts, fjord estuaries, and tide-mixed estuaries are located on the Pacific Coast.

6.1.3.1 Wave Beaten Coasts

Wave-beaten coasts border about 20 percent of the State's tidal shoreline. These nearshore and intertidal areas are extremely productive because waves, the primary mixing agent, churn nutrients from the sea floor up into the photic zone. The waters adjacent to the exposed headlands of the Gulf of Alaska coast and the rocky Aleutian shores support much greater concentrations of plant and animal life than the mud flats and silty beaches found along most of western and arctic Alaskan coasts. Phytoplankton and the large marine plants (e.g., kelp and intertidal seaweeds) are extremely abundant. Marine animals include high incidence of attached and intertidal species, such as snails, small crabs, barnacles and mussels. Because of the abundance of food, seabirds, marine mammals, and fish are plentiful.

6.1.3.2 Fjord Estuaries

Fjord estuaries indent most the of the State's tidal shoreline (about 70 percent). Productivity and species diversity are influenced by wave action in fjords, but there is little direct pounding and mixing. Fjord estuaries comprise all but the seaward inlets of Southeastern Alaska, Prince William Sound, and Shelikof Strait between Kodiak Island and the mainland. Many of the seaways have rocky bottoms over 400 feet deep. These waters become stratified, limiting high phytoplankton production to early spring "blooms." However, local upwelling creates some highly productive areas. Marine animal life is similar to that found in wave-beaten coastal waters but overall production of marine life is moderate to low because of limited seasonal productivity. The hydrography of fjords in association with extended sunlit summer periods, high energy and deep-lying, nutrient-rich waters, offers an unusually good opportunity for aquaculture.

6.1.3.3 Tide-Mixed Estuaries

About two percent of the tidal shoreline lies adjacent to tide-mixed estuaries and most of this ecosystem is found in Cook Inlet. Tides are the primary mixing agent in Cook Inlet, where tidal ranges and currents are extreme. Anchorage experiences tides ranging up to 30.4 feet. The tidal variance of Turnagain Arm is one of the few places in the world capable of producing tidal-generated power. However, the high suspended sediment loads, bottom instability, and present economic factors there make tidal power unlikely. Productivity in upper Cook Inlet waters is greatly curtailed because suspended sediments from glacier streams reduce light penetration. However, lower Cook Inlet is highly productive. Kachemak Bay may be the world's most productive estuarine fishery for its size and is an area where the State and the Federal government have initiated special land use provisions to add extra protection to the marine and terrestrial ecosystems that make up the Bay. Marine mammals and seabirds are not as abundant in Cook Inlet as in many areas of the State, but its shores are an important rest stop for migrating waterfowl as well as an important habitat for brown bear and salmon.

6.1.3.4 Bering Sea Coast

The coastal waters of the Bering Sea are influenced by sea ice during winters of most years. Bering Sea coasts comprise about four percent of the State's tidal shoreline. Mainland

coasts are silty and unusually wide with nearly flat offshore slopes. Near-shore plant productivity, particularly of kelp and eelgrass, is among the highest in the world. In protected areas, extensive patches of eelgrass, kelp, and other attached plants provide critical sea otter and fish habitat and essential staging grounds for migrating seabirds and water fowl. Other marine mammals are abundant. Seal, walrus, and whales contribute substantially to Eskimo subsistence harvest. Polar bears are seasonally present, following the edge of the ice pack in the northern Bering Sea.

6.1.3.5 Arctic Ocean Coast

All coasts north of the Bering Strait, approximately two percent of the State's total tidal shoreline, are bordered by sea ice in the winters of all years. Pack ice may be just offshore all summer. Most of the coastline is sedimentary and portions have extensive barrier islands and lagoon-forming spits. There is little shelter from ice movement and there are few harbors. The annual productivity is limited by sea ice and is the lowest of the State's marine waters. In a typical adaptation of arctic life to a harsh environment, the spring phytoplankton "bloom" actually begins under and within the sea ice. Lagoons are productive waterfowl and shorebird breeding areas. Many birds and marine mammals represented in this ecosystem are rare or non-existent south of the Bering Sea.

6.1.3.6 Continental Shelf

The Pacific continental shelf of Alaska is cut by large undersea valleys and averages a little over 50 miles in width. The continental shelf becomes discontinuous along the Aleutians Island chain but widens in the Bering Sea. Prehistorically a broad plateau bridging Asia and North America, the Bering Sea continental shelf underlies half of the Bering Sea. Most of it is within the 200 mile U.S. fishing limit established by Congress. The Arctic Ocean continental shelf averages slightly less than 50 miles in width. Major ocean currents flow north and west around the Gulf of Alaska and along the Aleutian Islands, then northward through the islands and up the western coast. A weak current flows westward along the northern coast. The Pacific Ocean shelf provides habitat for a variety of bottom, pelagic, anadromous, and shellfish species. The major commercial fisheries in the western Gulf of Alaska and the Aleutian Islands are King crab, tanner crab, and shrimp. In much of the Beaufort Sea, the coldness of the water and seasonal ice cover limit habitat for bottom fish. One of the world's largest flatfish and pollock fisheries is located on the southern edge of the Bering Sea shelf. Surface fish stocks, such as salmon and herring, are among the largest in the world.

6.1.4 Shoreland Ecosystems

There are six major land ecosystems abutting the Alaskan coastline: moist tundra, wet tundra (or marsh), alpine tundra, high brush, western hemlock-Sitka spruce coastal forest, and lowland spruce-hardwood forest. Each ecosystem has characteristic plant and animal populations and life cycles. The various ecosystems are discussed in geographical order from north to southeast.

6.1.4.1 Beaufort Sea Coastal Plain

This coastal zone area is predominately in federal ownership as part of the National Petroleum Reserve-Alaska (NPRA), and the Arctic National Wildlife Refuge. The treeless, wind-swept plain gradually ascends from the Beaufort Sea coast southward to the foothills of the Brooks Range. This flat to undulating coastal plain is underlain by unconsolidated deposits of marine, fluvial, glaciofluvial, and eolian origin and lacks bedrock control. Annual precipitation is low and mostly falls as snow during the winter. Due to low temperatures, permafrost is continuous across the region, except under large rivers and thaw lakes. Permafrost and frost processes contribute to a large variety of surface features such as pingos, ice-wedge polygons, and oriented thaw lakes.

The presence of permafrost prevents surface drainage so soils typically are saturated and have thick organic horizons. Due to the abundance of thaw lakes (covering up to 50 percent of the surface) and saturated soils, nearly the entire region supports wetland communities. Vegetation is dominated by wet sedge tundra and sedge-*Dryas* tundra on gentle ridges. Low willow thickets grow on well-drained riverbanks. Although drainage over most of the area is poorly integrated, there are numerous large, braided rivers that originate in the Brooks Range and drain northward to cross the coastal plain. Anadromous arctic cisco, broad whitefish, least cisco, and Dolly Varden char overwinter in these larger rivers and migrate to nearshore waters for the summer. Smaller streams often dry up or freeze completely during the winter. The coastal plain supports large caribou herds and is an important calving area. Important herbivores include muskoxen, lemmings, and arctic ground squirrels, while important predators include arctic foxes, gray wolves, and brown bears. Polar bears occasionally den on the coastal plain. The region also is important for breeding waterfowl, including a wide variety of shorebirds, ducks, geese, swans, and passerines.

6.1.4.2 Arctic Ocean Chukchi Sea/Bering Sea Coastal Zone

The majority of the Arctic Ocean coastal zone is located within the Alaska Maritime and Arctic units of the federally-owned National Wildlife Refuge System and the NPRA. The Bering Sea coastal zone is a mixture of Native Alaskan, National Wildlife Refuge, National Park Service (NPS) and Bureau of Land Management (BLM) ownership.

Most of the Arctic Ocean Chukchi Sea and Bering Sea coastal zone is moist tundra. A slight increase in topographical gradient facilitates runoff so that these tundra soils are less saturated and there is less standing water. Grasses and sedges are the dominant vegetation. Productivity is slightly lower than in the wet tundra. Saprophytes play a dominant role in the arctic and sub-arctic terrestrial food web. Since there are relatively few vertebrate species, most organic material ends up in the soil and is decomposed by dense populations of bacteria, fungi and soil invertebrates. Small mammals such as lemmings, because of their abundance and year-long residence, have a major above-ground impact on vegetation. During population peaks, approximately every three years, lemmings consume over one-third of the annual primary

production in the arctic.

Beach ridges surrounding aquatic habitats, serpentine barrens, limestone outcrops, marshes, sloughs and other ecologically important and fragile regions in the arctic and western coasts provide habitat for unique species of plants and animals. Sandy dune soils on the coast provide burrow and den sites for mammals ranging from arctic ground squirrel to wolf. Coincidentally, these dry soils are favored sites for sand and gravel removal and construction. Breeze-swept beaches provide insect-free habitat attractive to caribou and reindeer in the summer. Other common coastal mammals are grizzly bear, wolf, wolverine, arctic and red fox, weasel, and lemmings. There are no reptiles or amphibians in the Arctic or Western Alaska. Only about three amphibians are found in coastal Alaska, all in the southern and southeastern regions.

6.1.4.3 Seward Peninsula

The most extensive high brush ecosystems in the coastal zone are on the Seward Peninsula near Nome, along the Alaska Peninsula. The Seward Peninsula is a cold, wind-swept landmass jutting out into the Bering Sea, and represents the southernmost range of polar bears on mainland Alaska. This area of the coastal zone is largely in federal ownership. Sedimentary, metamorphic, and volcanic rocks intertwine to form a mosaic of coastal lowlands, expansive convex hills with scattered broad valleys, and small, isolated groups of rugged mountains. Vegetation is principally tundra, with alpine *Dryas*-lichen tundra and barrens at high elevations and moist sedge-tussock tundra at lower elevations. Patches of low-growing ericaceous and willow-birch shrubs occur on better-drained areas. Permafrost is continuous, but ranges from thin to moderately thick. Soils are often wet, shallow, and organic because of permafrost. Ice-related features such as pingos and patterned ground (raised polygons outlined by rock-filled ditches) are present. The climate is best classified as moist polar. The Chukchi Sea and Bering Strait afford very little climatic moderation since ice spans these waters over much of the year allowing direct passage of bitterly cold air from Siberia. Persistent cold, windy conditions occur in the winter and fog blankets the coastlines in the summer. At its height Pleistocene glaciation covered only the highest mountains. Back then the peninsula was part of an important ice-free migration corridor between North America and Asia. Strong ecological affinities to Asia remain to this day with the presence of Eurasian birds (gray-headed chickadee, yellow and white wagtails, bluethroat), fishes (Alaska blackfish), and flora. Streams occupy all larger valleys, and many lakes lie in broad inland valleys. Dense concentrations of lakes and ponds support abundant waterfowl (including the rare arctic loon) and nesting birds (e.g., spectacled eiders and ruddy and black turnstones) occur within coastal plains. Bears, caribou, snowy owls, arctic foxes, and Alaska hares, squirrels, muskrats, and beavers are common. Ribbon seals and walruses are often observed along shorelines and adjacent ice floes. Usually these dense coastal brush systems are alder thickets, often having a well-developed layer of grass and ferns below.

6.1.4.4 Bering Sea Islands

These rocky volcanic islands are scattered throughout shallow portions of the Bering Sea and are a mixture of federal ownership as part of the National Wildlife Refuge system and

Native Alaskan ownership. Here, an odd mix of polar and maritime climates exist, depending on the season. In winter, ice encapsulates the islands, ushering in dry polar air from Siberia. These conditions are replaced by cool, moist maritime conditions after spring ice breakup. Thin to moderately thick permafrost underlies mainly thin, rocky soils. At the height of the Pleistocene glaciation, these islands were mere hills within a vast seabed plain of the Bering Land Bridge. Life on these islands today possesses affinities to North America and Asia. Moist tundra communities of sedges, grasses, low shrubs, and lichens are surrounded by rocky cliffs and shorelines. Millions of seabirds (cormorants, kittiwakes, murres, puffins, and auklets) and marine mammals (northern fur seals, ribbon seals, and sea lions) inhabit these rocky outposts during the summer. Wintering flocks of rare spectacled eiders congregate in small polynyas (or openings) in the sea ice south of St. Lawrence Island.

6.1.4.5 Yukon-Kuskokwim Delta

The two most extensive wet tundra ecosystems are found on the central arctic coast and on the Yukon-Kuskokwim Delta. The Yukon and Kuskokwim Rivers nourish this vast, marshy delta as they fan out to meet the Bering Sea. This area is now included in the federally-owned Yukon Delta National Wildlife Refuge. The delta was formed from a combination of heavy sediment load carried by glacial runoff and from stabilization of sea levels after an initial rapid rise during deglaciation. Now in these areas, topographic relief is measured in inches. The unconsolidated sediments are comprised principally of marine tidal flats, beach deposits, and alluvium. Isolated basalt hills and volcanic cinder cones jut up in places. The climate is moist polar, ameliorated somewhat by the Bering Sea. At this latitude, sea ice spans the Bering Sea every winter allowing direct passage of cold Siberian fronts. Permafrost is discontinuous, moderately thick to thin, and relatively "warm." Impeded subsurface drainage caused by the permafrost contributes to shallow organic soils. Thermokarst lakes are abundant across the delta. In summer, ponds and lakes are ubiquitous. Many low-gradient streams meander dynamically across the surface. In the Yukon-Kuskokwim Delta, coastal vegetation is dominated by highly productive brackish marshes and wet meadows. Inland, permafrost-dominated landscapes support low birch-ericaceous shrubs and sedge-tussock and sedge-moss bogs. Willow thickets occur along rivers and on better-drained slopes. The diverse and abundant wetlands support exceptional populations of waterfowl, including brant, emperor geese, and tundra swans, sandhill cranes, shorebirds (Sabines' gulls, black turnstones, western sandpipers). It is estimated that the Yukon-Kuskokwim Delta ecosystem is important habitat for more than 1.75 million geese and swans, two million ducks, and more than 100 million shore and water birds. Whales, walruses, and bearded and ribbon seals patrol its shore while black bear, grizzly bears, moose, caribou and gray wolves roam the land. Arctic char, sheefish, and all five species of North American Pacific salmon are common fishes in rivers, streams, and surrounding sea.

6.1.4.6 Alaska Peninsula

Most of the coastal alpine tundra ecosystems are found on mountain ranges and on exposed ridges in the Aleutian Islands and the Alaska Peninsula. The general area is now included within the federally-owned Katmai National Park and Preserve, and Becharof, Alaska

Peninsula, Izembek, and Alaska Maritime units of the National Wildlife Refuge system. The Aleutian Range serves as the spine of this peninsula, which divides Bristol Bay from the north Pacific Ocean. The Alaska Peninsula narrows progressively toward the southwest as the range becomes increasingly submerged. The folded and faulted sandstone bedrock is dotted with symmetrical cinder cones clad with ice, pumice, and volcanic ash. The Pleistocene glaciation produced strongly contrasting topographies along this peninsula with smooth glacial moraines and colluvial shields on the north side and rugged deeply cut fjordlands on the south side. In turn, glacially fed streams flowing northward have low-energy, shallow channels, whereas those flowing southward have high-energy, deeply incised channels. Along the north side, huge lakes have filled behind young glacial moraines that act as dams. This ecosystem consists of barren rocks and rubble interspersed with low plant mats, both herbaceous and shrubby. Dominant vegetation is low shrub lands of willow, birch, and alder interspersed with ericaceous heath and *Dryas*-lichen communities. Ecological diversity is low. Regeneration is extremely slow. Some lichens may require over 60 years to recover after over-use or trampling. The peninsula is free of permafrost; however sea ice occasionally forms in Bristol Bay, demarcating the northern extent of sea otters. The coastline habitat supports numerous shorebirds and sea mammals. Many Stellar sea lion rookeries and haul-outs are present. Large populations of brown bears survive on abundant pink, chum, and silver salmon runs.

6.1.4.7 Aleutian Islands

This area is predominately in federal ownership as part of the Alaska Maritime National Wildlife Refuge. The Aleutian islands represent volcanic summits of a submarine ridge extending from the Alaska Peninsula to the Kamchatka Peninsula. The Aleutian island arc and deep sea trench are products of the Pacific crustal plate subducting or descending beneath the North American crustal plate. It is one of the most seismically and volcanically active areas in the world. The topography features glaciated and rubble-strewn volcanic cones indented with fjords and bordered by sea cliffs or wave-beaten platforms. These islands are free of permafrost, covered by volcanic-ash soils, and dissected radially by short, swift streams. A cool maritime climate with abundant year-round precipitation prevails over these islands. Terrestrial warming is subdued by incessant cold ocean winds and perpetual overcast clouds and fog which limits solar isolation. The flora is a blend of species from two continents, grading from North American to Asian affinities from east to west. Mountain flanks and coastlines are dominated by low shrubs of willow, birch, and alder interspersed with ericaceous-heath, *Dryas*-lichen, and grass communities. Alpine tundra and glaciers are on mountains. This island chain demarcates the southern boundary of the Bering Sea and is important for marine mammals (northern fur seals, Steller sea lions, and sea otters), waterfowl (Aleutian Canada geese, emperor geese), and seabirds (various species of auklet, red-legged kittiwakes). With their vast numbers, seabirds supply important fertilizing nutrients by splattering these islands with their guano.

6.1.4.8 Kodiak Island

Kodiak Island is a rugged, fjord-carved island complex; a geologic extension of the Chugach Mountains with a similar suite of folded and faulted sedimentary rocks of Pacific origin. During past glaciations, a solid ice sheet spanned Shelikof Strait connecting this group of

islands with the mainland. Ice engulfed most of the islands except for the highest mountains (nunataks) and some seaward coastal plains that provided refuge for plant and animal life. Ownership of this portion of the coastal zone is a mixture of Native Alaskan, State, and the federally-owned Kodiak National Wildlife Refuge.

Today, high sharp peaks with cirque glaciers and low rounded ridges overtop glacially scoured valleys covered with till or lacustrine deposits. Large terminal moraines occur offshore where many former glaciers extended onto the continental shelf. The flora of this island group is still recovering from the last glaciation. For instance, trees did not survive the last Pleistocene glaciation, and only recently have Sitka spruce and black cottonwood managed to regain a foothold. Today luxuriant forb/grass meadows and willow and alder thickets cover the majority of these islands. Some alpine tundra exists at higher elevations. The climate is cool, wet maritime with minimal seasonal temperature variation and extended periods of overcast clouds, fog, and precipitation. A seemingly endless stream of moisture blows in during the fall from repeating lows sweeping eastward along the Aleutians. These islands are entirely free of permafrost. Offshore waters are rich with deepwater fish, such as halibut and cod, and marine mammals, including sea otters, Stellar's sea lions, and a variety of whales. Small, swift rivers and streams radiating from the highlands harbor abundant salmon runs. These runs funnel tremendous amounts of nutrients to these islands and help support populations of the largest land carnivore in the world, the Kodiak brown bear. Puffins and auklets nest on the islands' rocky shoreline cliffs.

6.1.4.9 Cook Inlet

The gently sloping lowland of the Cook Inlet Basin was buried by ice and flooded by proglacial lakes several times during the Pleistocene. This portion of the coastal zone is primarily in State and private ownership. The basin floor is comprised of fine-textured lacustrine deposits ringed by coarse-textured glacial tills and outwash. Numerous lakes, ponds, and wetlands attract large numbers of waterfowl (including trumpeter swans) and shorebirds. Dolly Varden and white fish occur in fresh waters. Several river systems support recovering salmon runs and resultant bear and raven populations. The basin is generally free of permafrost. A mix of maritime and continental climates prevails with moderate fluctuations of seasonal temperature and abundant precipitation. This climate, coupled with the flat to gently-sloping, fine-texture surfaces give rise to wet, organic soils that support black spruce forests and woodlands. Ericaceous shrubs are dominant in open bogs. Mixed forests of white and Sitka spruce aspen and birch grow on better-drained sites and grade into tall shrub communities of willow and alder on slopes along the periphery of the basin. A mixture of wetland habitats supports numerous moose, black bears, beavers, and muskrats.

6.1.4.10 Kenai Peninsula

Lowland spruce-hardwood meets the coastline only in upper Cook Inlet and on the northern Kenai Peninsula. The western and southern part of the Peninsula are a mixture of State, private, and federal ownership. Willow scrub covers extensively burned areas on the Kenai Peninsula and this secondary growth supports one-third of the State's moose population. This

high population of moose is a direct reflection of past forest fires that created favorable moose habitat. As forest fire prevention methods improved the State and federal fire management agencies have instituted a series of prescribed burns and areas where natural wildfires may burn within prescribed areas and weather conditions. Because productive bottom lands in Alaska are the prime habitat for large mammals, populations of moose, caribou and bear have been reduced by this displacement. Most of the coastal zone east of Cook Inlet is western hemlock-Sitka spruce coastal forest ecosystem. Mainland areas have considerable alpine tundra, but Prince William Sound and southeast Alaska are mossy, temperate rain forests.

6.1.4.11 Gulf of Alaska Coast

Lush, lichen-draped temperate rain forests of hemlock and spruce interspersed with open wetlands blanket the shorelines and adjacent mountain slopes along the Gulf of Alaska. This forest produces 95 percent of the commercial timber cut in Alaska and contains over 80 percent of the saw timber volume. The vast majority of the uplands are owned by the Federal government as part of either the Chugach or the Tongass national forests and Glacier Bay National Park.

A cool, hyper maritime climate dominates with minor seasonal temperature variation and extended periods of overcast clouds, fog, and precipitation. Snow is abundant in the winter and persists for long periods at sea level. Permafrost is absent. Tectonic events have raised and submerged various portions of the coastline through time. Common forest animals include black and brown bears and Sitka black-tailed deer, brown bear, mink and land otter. Most of the world's bald eagle population inhabits southeast Alaska. Common murres, Bonaparte's gulls, Steller's sea lions, harbor seals, and sea otters teem along its shorelines. Numerous streams and rivers support Dolly Varden, steelhead trout, and all five species of Pacific salmon.

Salmon spawning runs deliver tremendous amounts of nutrients to aquatic and terrestrial systems. A fjordal coastline and archipelago exists around Prince William Sound and points west where continental ice sheets repeatedly descended in the past. Here, fjords formed where glacier-carved terrain filled with seawater after deglaciation. At the head of fjords lie broad U-shaped valleys that have steep, deeply incised side walls draped with hanging glacial valleys. A coastal foreland extends from the Copper River Delta southeast to Icy Point, fringed by the slopes and glacier margins of the Chugach-St. Elias Mountains. Here, unconsolidated glacial, alluvial, and marine deposits have been uplifted by tectonics and isostatic rebound to form a relatively flat plain. Because of its geographic position, the foreland is water-drenched through persistent maritime precipitation and overland runoff from the mountains. The organic soils shed water slowly and are blanketed with wetlands among meandering and braided silt-laden streams. Temperate rain forests of hemlock and spruce grow sporadically where soil drainage affords. Rare dusky Canada geese and trumpeter swans nest on these wet flats where brown bears, Sitka black-tailed deer, and moose roam.

6.1.4.12 Alexander Archipelago

This rugged area consists of a series of accreted terrains of Pacific origin heavily scoured in the past by ice sheets. The uplands are primarily in federal ownership as part of the Tongass National Forest. This island-rich fjordland formed when the glacier-carved landscape filled with seawater after deglaciation. Exceedingly deep waters exist where thick rivers of ice flowed along geologic faults. Today, these marine waters support humpback whales, orcas, seals, and sea otters. At the head of fjords lie broad U-shaped valleys that have steep, deeply incised side walls draped with hanging glacial valleys. Rounded mountains with rolling till plains occur where continental and piedmont glaciers overrode the land. High, steep-sided, angular mountains (i.e., former nunataks), some still sporting alpine glaciers, rise above the reach of these overriding glaciers. Rebound after the withdrawal of the continental ice sheets, together with tectonic movements, have both raised and lowered marine terraces, giving rise to rich coastal lowlands and estuaries.

A cool, hyper maritime climate dominates with minor seasonal temperature variation and extended periods of overcast clouds, fog, and precipitation. Snow, though abundant in some locations, is ephemeral at sea level. Lush, lichen-draped temperate rain forests of hemlock and spruce blanket the shorelines and mountain slopes where soil drainage allows. Open and forested wetlands occur on poorly drained soils, especially on compact glacial tills, marine terraces, and gentle slopes. On upper slopes, forests progressively give way to scrublands, landslide and avalanche tracks, and alpine tundra. Numerous short and swift streams support Dolly Varden and steelhead trout, and all five species of Pacific salmon. The land and sea are intimately connected as spawning salmon return to their native streams and, in the process, cycle tremendous amounts of nutrients back to the freshwater and terrestrial systems which bore them life. Streams become increasingly littered with spawned-out carcasses as brown and black bears, bald eagles, and sea gulls feast on returning salmon from late spring to early fall.

Southeast Alaska has about 1,000 of the State's 1,800 named islands, rocks, and reefs (several thousand remain unnamed). Kodiak Island, Nunivak Island, St. Lawrence Island, the six largest islands of Southwest Alaska, and the Aleutian Islands total almost 23,000 square miles. Most of the major seabird and marine mammal rookeries are located on the isolated wave-beaten coasts of islands. As noted previously, most of the coastal uplands on the islands, rocks and reefs are in federal ownership as part of the national wildlife refuge or national forest systems. Indigenous island species are extremely sensitive to disturbances. Marine mammal and seabird concentrations in rookeries are susceptible to harassment by humans and the environmental changes that accompany man's presence, including marine oil spills, domestic animals, and aircraft noise. The most limited and sensitive habitats in Alaska may be certain island seabird breeding colonies. The endangered Aleutian Canada goose and a growing population of now-endangered sea otters also inhabit the remote Aleutian Islands.

6.1.5 Fisheries

This section provides a brief discussion of the commercial, sport, and subsistence uses of marine and anadromous fisheries that may be affected by the proposed coastal program changes. The section is divided into groundfish, salmon, other anadromous fish, and shellfish. The

information presented for each species supports the development of this EIS and is not intended to be exhaustive. The species discussed below were selected in part based on their importance as commercial and subsistence species. Detailed information on groundfish species and additional information on principal target species can be found in the *Final Environmental Impact Statement for Essential Fish Habitat Identification and Conservation in Alaska* (NMFS, April 2005)

6.1.5.1 Groundfish

The groundfish complex is the most abundant of all fisheries resources off Alaska, totaling more than 21 million metric tons (t) of exploitable biomass and contributing more than two million t of catch each year. Another one million t of underutilized sustainable potential yield is available. Groundfish of economic significance in Alaska include Pacific halibut, walleye pollock, Pacific cod, and flatfish species: Greenland Turbot, Yellowfin sole, Rock sole, Arrowtooth flounder, Sable fish, Pacific ocean perch, Rockfish, and Atka mackerel.

6.1.5.2 Pacific Salmon

Pacific salmon occupy a special place in the lives of all Alaskans. Native people and their heritage have a long, rich tradition of relying on salmon for economic, cultural, and subsistence purposes. Today, residents and nonresidents depend heavily on this resource for recreation, food, and livelihood. The commercial fisheries, along with a rapidly growing salmon and groundfish sport fishery, provide the State with its largest source of private-sector employment.

Along Alaska's 44,500-mile coastline, 15,998 interior water bodies support populations of five salmon species. Salmon management over such a vast area requires a complex mix of domestic and international bodies, treaties, regulations and other agreements. Federal and State agencies cooperate in managing salmon fisheries. The Alaska Department of Fish and Game (ADFG) manages salmon fisheries within State jurisdictional waters where the majority of harvest occurs. Management in the federal Exclusive Economic Zone (3-200 miles offshore) is the responsibility of the North Pacific Fishery Management Council, which has deferred specific regulations to the State. Management of Pacific salmon fisheries is based primarily on regional stock groups of each species and on time and area harvesting by specific types of fishing gear. Because salmon are anadromous fish that spend a portion of their life (one to seven years) at sea and then return to freshwater streams, rivers, and lakes to spawn and die, their well being and harvest management practices are also directly influenced by land management practices. The quality of freshwater habitats determines the success of reproduction and initial rearing of juveniles. Several agencies, entities and groups have significant influence on the quality of freshwater spawning and rearing habitats for salmon throughout Alaska. Included among these are the U.S. Forest Service, BLM, NPS, National Wildlife Refuges, Alaska State Parks and Forests, ADFG, Native Alaskan Regional and Village Corporations, plus municipalities, boroughs, and other private landowners that control watersheds used by salmon.

Five species of Pacific salmon (pink, sockeye, coho, chum, and chinook) indigenous to

Alaska are fully utilized, and stocks in most regions of the State generally have been rebuilt to or beyond previous high levels.

Pink

Pink salmon adults, eggs, alevins, and fry provide a major nutrient and food source for aquatic invertebrates, other fish, birds (including eagles and gulls), and mammals (including bears, otter, and mink in freshwater systems). In the marine environment, pink salmon fry and juveniles are food for a host of other fishes and coastal seabirds. Subadult and adult pink salmon are known to be eaten by 15 different marine mammals, sharks, other fishes such as Pacific halibut. Because pink salmon are the most abundant salmon in the North Pacific, it is likely that they comprise a significant portion of the salmonids eaten by marine mammals. Millions of pink salmon adults returning to spawn in thousands of streams throughout Alaska provide significant input into the trophic levels of these watersheds.

The average annual Alaska harvest since 1959 is 45.1 million pink salmon. The ten-year average harvest (1983-1992) is 77.4 million pink salmon. In 1991 the Alaska harvest represented about 96 percent of the total North American harvest. Pink salmon fisheries are important in all coastal regions of Alaska south of Kotzebue Sound. It is called the "bread and butter" fish in many Alaskan coastal fishing communities because of its importance to commercial fisheries and thus to local economies. Pink salmon also contribute substantially to the catch of sport anglers and subsistence users in Alaska. Runs declined markedly during the 1940s and 1950s; however, intensive effort is being made to rebuild and enhance those runs through hatcheries, fish ladders, and improved fisheries management.

Sockeye

Sockeye salmon support one of the most important commercial fisheries on the Pacific coast of North America. The largest harvest of sockeye salmon in the world occurs in the Bristol Bay area of southwestern Alaska where ten million to more than 30 million sockeye salmon may be caught each year during a short, intensive fishery lasting only a few weeks. Relatively large harvests of one million to six million sockeye salmon are also taken in Cook Inlet, Prince William Sound, and Chignik Lagoon. There is also a growing sport fishery for sockeye salmon throughout the State. Probably the best known sport fishery with the greatest participation occurs during the return of sockeye salmon to the Russian River on the Kenai Peninsula. Other popular areas include the Kasilof River on the Kenai Peninsula as well as the various river systems within Bristol Bay.

Subsistence users harvest sockeye salmon in many areas of the State. Aboriginal people consider sockeye salmon to be an important food source. The greatest subsistence harvest of sockeye salmon probably occurs in the Bristol Bay area where participants use set gillnets. In other areas of the State, sockeye salmon may be taken for subsistence use in fishwheels. Most of the subsistence harvest consists of prespawning sockeye salmon, but a relatively small number of

postspawning sockeye salmon are also taken. Personal use fisheries have also been established to make use of any sockeye salmon surplus to spawning needs, subsistence uses, and commercial and sport harvests. Personal use fisheries have occurred in Bristol Bay, where participants use set gillnets, as well as in Cook Inlet and Prince William Sound, where participants also use dip nets.

Coho

Adult coho provide important food for bald eagles, terrestrial mammals (such as brown and black bear and river otter), and marine mammals (such as Steller sea lion, harbor seal, beluga, orca, and salmon sharks). Adult coho play a very important role, as do the other species, in transferring essential nutrients from marine to freshwater environments. Juveniles are eaten by birds (gulls, terns, kingfishers, cormorants, mergansers, and herons), fish (Dolly Varden, steelhead, cutthroat trout, and arctic char), and mammals (mink and water shrew). Juvenile coho are also significant predators of pink salmon fry during their seaward migration. Marine invertebrates are the primary food when coho first enter salt water, and fish prey increase in importance as the coho grow. The coho salmon is a premier sport fish and is taken in fresh and salt water from July to September. In 1986, anglers throughout Alaska took 201,000 coho salmon.

Chum

Chum salmon have the widest distribution of any of the Pacific salmon. They range south to the Chum salmon are the most abundant commercially harvested salmon species in arctic, northwestern, and Interior Alaska, but are of relatively less importance in other areas of the state. There they are known locally as "dog salmon" and are a traditional source of dried fish for winter use. In the last few years an average of 11 million chum salmon, worth over $32 million, have been caught in Alaska's commercial fishery. Most chum are caught by purse seines and drift gillnets, but fishwheels and set gillnets harvest a portion of the catch. In many areas they have been harvested incidental to the catch of pink salmon. The development of markets for fresh and frozen chum in Japan and northern Europe has increased their demand, especially in the last decade. The Alaska Department of Fish and Game has built several hatcheries primarily for chum salmon products.

Sport fishers generally capture chum salmon incidental to fishing for other Pacific salmon in either fresh or salt water. Statewide sport harvest usually totals fewer than 25,000 chums. In arctic, northwestern and Interior Alaska, chum salmon remain an important year-round source of fresh and dried fish for subsistence and personal use purposes. After entering fresh water, chums are most often prepared as a smoked product.

Chum salmon eggs, alevins, and juveniles in fresh water provide an important food source for many birds (including gulls, crows, magpies, ouzels, and kingfishers), small mammals, other fishes, and many invertebrates. Chum salmon carcasses provide nutrients for the freshwater watersheds and estuaries. The adult chum salmon that return to the Chilkat River system near Haines, Alaska, feed large numbers of bald eagles that congregate on the spawning

grounds between September and December. Spawning fish and spent carcasses provide a major food source for brown and black bears, wolverines, wolves, and many other small mammals. Many species of invertebrates also use the carcasses for food. Juvenile chum salmon eat mostly invertebrates, while adults consume amphipods, euphausiids, pteropods, copepods, gelatinous zooplankton, fish, and squid larvae.

Chinook

The chinook salmon is Alaska's State fish and is one of the most important sport and commercial fish native to the Pacific coast of North America. It is the largest of all Pacific salmon, with weights of individual fish commonly exceeding 30 pounds. Chinook salmon eggs, alevins, and juveniles in fresh water provide an important nutrient input and food source for

aquatic invertebrates, other fishes, birds, and small mammals. The carcasses of Chinook adults can also be an important nutrient input to their natal watersheds, as well as providing food for terrestrial mammals such as bears, otter, mink, and birds (such as gulls, eagles, and ravens).

The chinook salmon is perhaps the most highly prized sport fish in Alaska and is extensively fished by anglers in the southeast and Cook Inlet areas. Catches by subsistence fishers in southwest and south-central areas from 1976 through 1986 averaged approximately 90,000 chinook salmon. Approximately 90 percent of the subsistence harvest is taken in the Yukon and Kuskokwim rivers.

6.1.5.3 Anadromous Fish

Anadromous fish managed under ADFG regional Alaska Management Area plans and federal Subsistence Management Regulations where the species reside on federal lands include Coastal Cutthroat Trout, Steelhead Trout, Dolly Varden, Eulachon, Lamprey, Lingcod, and Pacific Herring. Size and bag limits are established by the Alaska Board of Fisheries.

6.1.5.4 Shellfish

Alaska’s major shellfish fisheries developed in the 1960s in the Gulf of Alaska, subsequently expanding to the Bering Sea and Aleutian Islands region. The most important of these are the king and snow crab fisheries. King and Tanner crab fisheries are managed primarily by the State of Alaska, with advice from a federal fishery management plan for the Bering Sea and Aleutian Islands stocks. Shrimp and other nearshore fisheries are managed by the State of Alaska. Other shellfish of important include Dungeness crab, giant Pacific weathervane scallops, and razor clams.

6.1.6 Marine Mammals

The Alaska region has 39 stocks of 24 species of marine mammals. Three of these species (sea otter, polar bear, and walrus) are managed by the U.S. Fish and Wildlife Service (USFWS), and the remaining cetaceans and pinnipeds are managed by NMFS. According to the criteria provided in the 1994 Amendments to the Marine Mammal Protection Act (MMPA), these include ten strategic stocks: the northern fur seal, the sperm whale, the western North Pacific and central North Pacific humpback whales, the fin whale, the North Pacific right whale, and the bowhead whale; the Cook Inlet stock of beluga; and the western U.S. Pacific stock of Stellar sea lions as well as the eastern Pacific stock of this species. Of the 39 stocks, nine are believed to be increasing, five are stable, three are declining, and the population status of the remaining 22 are known. Eight stocks, the western U.S. Pacific stock of the Steller sea lion, the northern fur seal, the Gulf of Alaska harbor seal and all stocks of beluga whales, are subject to subsistence harvests. While most marine mammal stocks are assessed under the authority of Section 117 of the MMPA, NMFS determined that management of the stocks subject to subsistence harvests that do not have significant commercial takes should be developed through the co-management process described in Section 119 of the Act. The marine mammals discussed below are intended to be representative samplings of potentially impacted species, and are not intended to be complete and exhaustive. They were selected in part based on their importance as subsistence resources. (NMFS,1999)

6.1.6.1 Polar Bears

Polar bears occur in the ice-covered portions of the Bering, Chukchi and Beaufort seas adjacent to Alaska, and are closely associated with the pack ice of the Arctic Ocean throughout most of the year. Some females move to coastal areas, and occasionally farther inland, during October and November to seek maternity den sites, depending on ice movement and ice buildup. When the nearshore ice breaks up in the spring, the bears move with the sea ice and many concentrate at the south edge of the ice pack. This position varies seasonally but usually is between the coast and latitude 72° North. Except for a shore lead, the Beaufort Sea is ice covered year-round. Nearshore open water begins to freeze in September or October, and nearshore ice does not melt until May or early June. Male and nondenning female polar bears inhabit the sea ice throughout the winter. Polar bear movements are extensive and individual activity areas are enormous. The distribution of polar bears is influenced by the availability of their major prey species, ringed and bearded seals, which concentrate in areas of drifting pack ice. Ringed seals probably constitute 95 percent of the polar bear's diet, although they also eat walruses and some other marine mammals.

Historically, polar bears have been killed for subsistence, handicrafts and recreation. The continue to be an important renewable resource for coastal communities throughout northern Alaska. Polar bears provide a source of meat and raw materials for handicrafts, including functional clothing such as mittens, boots (mukluks), parka ruffs and pants. Polar bears and polar bear hunting were an important part of earlier religions, myths and legends, and continue to play an important role in the Inupiat and Yupik culture. Polar bear hunting is a source of pride, prestige, and accomplishment. Today, residents from 14 villages actively hunt polar bears; the level of hunting effort varies from village and by year. In addition, a small bear viewing tourism industry is developing in some coastal communities.

(http://alaska.fws.gov/fisheries/mmm/polarbear/phistory.html, last viewed: 7/15/2004)

Polar bears are protected under the provisions of the MMPA of 1972. Additionally, an international agreement for the conservation of polar bears was ratified in 1976 by the governments of Canada, Denmark, Norway, the former USSR, and the U.S. The treaty requires management of shared populations by consultations. Article II requires that appropriate actions be taken to protect ecosystems of which polar bears are a part, especially denning and feeding sites. As Russia shares a population of polar bears with the United States, the two governments and native groups in the Russian Far East and Alaska drafted and signed an international treaty, ratified by the U.S. Senate, which allows hunting by Russian natives and places quota restrictions on both U.S. and Russian natives. Currently in Alaska, about 100 polar bears are harvested every year by natives under the subsistence provision of the MMPA. The only restriction in place is

that if they kill a bear, the carcass must be used in some way. Natives are not allowed to sell the skins, but may make and sell products from them.
(http://www.polarbearsinternational.org/facts.php, last viewed: 6/28/2005)

6.1.6.2 Sea Otters

(Note: This and the next marine mammals' information came from: http://www.marinemammalcenter.org/learning/education/mammalinfo/seaotter.asp, last viewed, 6/29/2005)

Ninety percent of the world's sea otters live in coastal Alaska. Because sea otters forage almost exclusively on bottom-dwelling marine invertebrates such as clams, snails, crabs, and sea urchins, they predominantly occur near shore. In addition, sea otters prefer places with kelp, which acts as an anchor that the sea otters use to wrap themselves in when they are resting. Their offshore distribution is limited by their diving ability; although they are capable of diving to more than 100 meters deep, most of their feeding takes place between the shoreline and depths of 40 meters. (Bodkin and Monson)

A substantial decline in the southwest Alaska otter population appears to have begun in the mid- to late 1980s. In the Aleutians, there were approximately 55,000 to 74,000 sea otters in the mid-1980s, representing almost half of the world's estimated population of sea otters at that time. Aerial surveys since that time, however, indicate a progressive decline in the number of otters in the Aleutians, where the current population is estimated to be less than 9,000 animals. Survey results also show substantial declines have occurred in the Alaska Peninsula, where the counts of otters have declined by more than 65 percent since the mid 1980s. In the Kodiak Archipelago, surveys indicate the number of otters has declined more than 55 percent since the late1980s. Overall, the population has declined an estimated 56 to 68 percent over the past ten to 15 years, and recent surveys indicate the decline is continuing.

The cause of the population decline is not clear. Production of young does not appear to

be reduced, nor is there evidence that starvation, disease, or contaminants are involved. There also is no evidence that entanglement in commercial fishing gear or competition with fishermen for prey species is playing a significant role in the decline, and annual subsistence harvest by Native Alaskans is believed to be too low to contribute significantly to the decline. Some evidence points to predation by killer whales as a possible cause of the decline in the Aleutian Island chain. (USFWS Press Release, 2/11/2004)

The MMPA protects sea otters. It prohibits commercial harvest of sea otters, and allows Alaska natives to hunt sea otters for subsistence and creation of handicrafts. The USFWS has developed agreements with the Alaska Sea Otter Commission to co-manage the subsistence harvest of sea otters. The primary threats to the sea otter are generally human-related, and include: competition for shell fish, mariculture, oil and gas transport, logging activities in coastal areas, and commercial fishing. Sea otters have just recently been designated a threatened species under the ESA.

6.1.6.3 Northern Elephant Seal

Northern elephant seals are found in the North Pacific, from Baja California, Mexico to the Gulf of Alaska and Aleutian Islands. During the breeding season, they live on beaches on offshore islands and a few remote spots on the mainland. The rest of the year, except for molting periods, the elephant seal lives well off shore (up to 5,000 miles), commonly descending to over 5,000 feet below the ocean's surface.

6.1.6.4 Steller Sea Lion

Stellers are found throughout the North Pacific Rim from Japan to central California. Unlike California sea lions, Stellers tend to remain off shore or haul out in unpopulated areas. Breeding occurs along the North Pacific Rim from Año Nuevo Island in central California to the Kuril Islands North of Japan, with the greatest concentration of rookeries (breeding grounds) in the Gulf of Alaska and Aleutian Islands.

The current population of Steller sea lions is about 40,000, with about 500 living in California. However, there is great concern about this population, which has dropped by 80 percent in the last 30 years. In 1997, the western stock in Alaska was listed as endangered and the eastern stock of the Continental United States and Canada was listed as threatened. Reasons for this decline are not known. However, researchers believe that a decline in the fish they eat may be the biggest factor. The decline of fish could be due to increasing commercial fisheries in the Gulf of Alaska. Drowning, entanglement in nets, and gunshot are all possible reasons for the Stellers' decline. Stellers are protected under the MMPA, which forbids the killing, harming, or harassing of any marine mammal, as well as the Endangered Species Act (ESA).

6.1.6.5 Northern Fur Seal

The full range of the northern fur seal extends throughout the Pacific rim from Japan to

the Channel Islands of California, although the main breeding colonies are in the Pribilof and Commander Islands in the Bering Sea. Northern fur seals live almost exclusively in the open ocean, and only use certain offshore islands for pupping and breeding. They rarely come ashore except during these times, and are almost never seen on mainland beaches unless they are sick. Northern fur seals feed on small schooling fish, such as walleye pollock, herring, hake and anchovy, and squid.

Once hunted in large numbers for their luxurious pelts, northern fur seals are now protected under the MMPA as a depleted species. This means that it is illegal to kill them except for research or native subsistence. The current world population is less than one million, and is declining. Commercial fishing operations may be contributing to the decline, by decreasing availability of fish and entanglement in fishing gear. Also, fur seals are especially sensitive to changes in their environment.

6.1.6.6 Pacific Walrus

The Pacific walrus mainly inhabits the shallow continental shelf waters of the Bering and Chukchi seas. The distribution of Pacific walruses varies markedly with the seasons. Virtually the entire population occupies the pack ice in the Bering Sea in the winter months. Through the winter they generally congregate in two areas, one immediately southwest of St. Lawrence Island and the other in outer Bristol Bay. As the Bering Sea pack ice begins to loosen in April, walruses begin to move northward and their distribution becomes less clustered. By late April the distribution extends from Bristol Bay northward to the Bering Strait. During the summer months, as the pack ice continues to recede northward, most of the population migrates into the Chukchi Sea. The largest concentrations are found near the coasts, between 70 degrees North and Point Barrow in the east and between Bering Strait and Wrangel Island in the west. Concentrations, mainly of males, are also found on and near terrestrial haulouts in the Bering Sea in Bristol Bay and the northern Gulf of Anadyr throughout the summer. In October the pack ice develops rapidly in the Chukchi Sea, and large herds begin to move southward. Many come ashore on haulouts in the Bering Strait region. Depending on ice conditions, those haulout sites continue to be occupied through November and into December, but with the continuing development of ice, most of them move south of St. Lawrence Island and the Chukchi Peninsula by early to mid-December.

Although capable of diving to deeper depths, Pacific walruses for the most part are found in waters of 100 meters or less, possibly because of higher productivity of their benthic foods in the shallower water. In some instances walruses forage along rocky substrates. Clams are their most commons food, however other invertebrates such as sea cucumbers, crabs, and segmented worms are frequently found in their stomachs. Walruses rarely consume fish. They are frequently reported to prey on small seals such as ringed and ribbon seals.

Isolated sites such as islands, points, spits, and headlands are occupied most frequently. A wide variety of substrates apparently are suitable, but protection from strong winds and surf seems also to be important. Social factors, learned behavior, and proximity to prey probably influence the location of haulout sites but little is known about such factors. In Alaska, major

terrestrial haulouts are found in Bristol Bay at Cape Seniavin, Round Island, Cape Pierce, and Cape Newenham. Consistent seasonal occupation of specific haulouts by some individuals suggests at least some degree of site fidelity. Limited data from tagging and radio-tracking studies suggest that site fidelity may be interrupted by human disturbances.

Pacific walruses are an important source of meat and ivory for Native peoples of Alaska and the Chukotka Peninsula, Russia. Over the past forty years, the Pacific walrus population has sustained estimated annual harvest mortalities ranging from 3,200 to 16,100 animals per year. Recent harvest levels are lower than historic highs. It is not known whether lower harvest levels reflect changes in walrus abundance or hunting effort. Factors affecting harvest levels include the cessation of Russian commercial walrus harvests after 1991, changes in political, economic, and social conditions of subsistence hunters in Alaska and Chukotka, and the effects of variable weather and ice conditions on hunting success. In 1997, a Cooperative Agreement was developed between the USFWS and the Alaska Eskimo Walrus Commission to facilitate the participation of subsistence hunters in activities related to the conservation and management of walrus stocks in Alaska. Specific activities carried out under this agreement have included the strengthening and expansion of harvest monitoring programs in Alaska and Chukotka as well as efforts to develop locally based subsistence harvest regulations.

6.1.6.7 Whales:

Several species of whales spend at least part of their time feeding in Alaskan waters. These include the Baird's beaked, Beluga, Blue, Bowhead, Cuvier's beaked, Fin, Gray, Humpback, Killer, Minke, North Pacific Right, Sperm, Sei, Pacific white-sided dolphin, harbor porpoise, and Dall's porpoise. Of these whales, four species are hunted for subsistence purposes by Native Alaskans, including Beluga, Bowhead, Gray whale, and Minke whales (rarely). There is no known subsistence harvest of Baird's beaked whales, Blue whales, Cuvier's beaked whales, Dall's porpoise, Fin whale, harbor porpoise, Humpback whales, Pacific white dolphin, North Pacific right whales, Killer Whales, Sperm whales, and Stejneger's beaked whales. Below is a discussion of whales listed as endangered or considered important for subsistence purposes.

Beluga

Beluga whales are distributed throughout seasonally ice-covered arctic and subarctic waters of the Northern Hemisphere, and are closely associated with open leads and polynyas in ice-covered regions. Depending on season and region, beluga whales may occur in both offshore and coastal waters, with concentrations in Cook Inlet, Bristol Bay, Norton Sound, Kasegaluk Lagoon, and the Mackenzie Delta. It is assumed that most beluga whales from these summering areas overwinter in the Bering Sea, excluding those found in the northern Gulf of Alaska. Seasonal distribution is affected by ice cover, tidal conditions, access to prey, temperature, and human interaction. During the winter, beluga whales occur in offshore waters associated with pack ice. In the spring, they migrate to warmer coastal estuaries, bays, and rivers for molting

and calving. Beluga whales are not a listed species under the ESA. Beluga whales are hunted for subsistence by Native Alaskans.

Bowhead Whale

Bowhead whales are distributed in the seasonally ice-covered waters of the Arctic and near-Arctic, generally north of 54°N and south of 75°N in the western Arctic Basin. For management purposes, five stocks are currently recognized by the International Whaling Commission. Small stock occur in the Sea of Okhotsk, Davis Strait, Hudson Bay, and the offshore waters of Spitsbergen. The small bowhead stocks are comprised of only a few tens to a few hundreds of individuals. The largest population, and the only stock that is found within U.S. waters, is the Western Arctic stock. The majority of the Western Arctic stock migrates annually from wintering areas (November to March) in the northern Bering Sea, through the Chukchi Sea in the Spring (March through June), to the Beaufort Sea where they spend much of the summer (mid-May through September) before returning again to the Bering Sea in the Fall (September through November) to overwinter. The bowhead spring migration follows fractures in the sea ice around the coast of Alaska, generally in the shear zone between the shorefast ice and the mobile polar pack ice. There is evidence of whales following each other, even when their route does not take advantage of large ice-free areas, such as polynyas. As the whales travel east past Point Barrow, Alaska, their migration is somewhat funneled between shore and the polar pack ice. Most of the year, bowhead whales are closely associated with sea ice. Only during the summer is this population in relatively ice-free waters in the southern Beaufort Sea, and area often exposed to industrial activity related to petroleum exploration and extraction. During the autumn migration, bowheads select shelf waters in all but "heavy ice" conditions, when they select slope habitat. Sightings of bowhead whales do occur in the summer near Barrow and are consistent with suggestions that certain areas near Barrow are important feeding grounds. Some bowheads are found in the Chukchi and Bering Seas in summer, and these are thought to be part of the expanding western Arctic stock.

Eskimos have been taking bowhead whales for at least 2,000 years. Subsistence takes have been regulated by a quota system under the authority of the IWC since 1977. Native Alaskan subsistence hunters take approximately 0.1-0.5 percent of the of the population per annum, primarily from nine Alaskan communities. Under this quota, the number of kills has ranged from 14–72 per year, depending in part on changes in management strategy and in part on higher abundance estimates in recent years. The total take by Native Alaskans, including struck and lost, was reported to be 66 in 1997, 54 in 1998, 47 in 1999, 47 in 2000, and 75 in 2001. Canadian Natives are also known to take whales from this stock. Hunters from the western Canadian Arctic community of Aklavik killed one whale in 1991 and one in 1996. The annual average subsistence take (by Natives of Alaska and Canada) during the five-year period from 1997 to 2001 is 58 bowhead whales. The bowhead whale is listed as "endangered" under the ESA of 1973, and therefore designated as "depleted" under the MMPA

Fin Whale

Within the U.S. waters in the Pacific, fin whales are found seasonally off the coast of

North America and Hawaii, and in the Bering Sea during the summer. Offshore hydrophone arrays along the U.S. Pacific coast, in the central North Pacific, and in the western Aleutian Islands have documented high levels of fin whale call rates along the U.S. Pacific coast beginning in August/September and lasting through February, suggesting that this may be an important feeding area during the winter. In addition, recent surveys in the central-eastern and southeastern Bering Sea in 1999 and 2000 resulted in new information about the distribution and relative abundance of fin whales in these areas. Fin whale abundance estimates were nearly five times higher in the central-eastern Bering Sea than in the southeastern Bering Sea, and most sighting in the central-eastern Bering Sea occurred in a zone of particularly high productivity along the shelf break. The fin whale is listed as "endangered" under the ESA of 1973, and therefore designated as "depleted" under the MMPA. Subsistence hunters in Alaska have not been reported to take fin whales, and there are no known habitat issues that are particular concern for this stock.

Gray Whale

The gray whale formerly occurred in the North Atlantic Ocean, but is currently only found in the North Pacific. Two stocks have been recognized in the North Pacific: the Eastern Pacific stock, which breeds along the west coast of North America, and the Western Pacific or "Korean" stock, which apparently breeds off the coast of eastern Asia. Most of the Eastern North Pacific stock spends the summer feeding in the northern Bering, Chukchi, and Beaufort Seas. However, gray whales have been reported feeding in the summer in waters off of Southeast Alaska, British Columbia, Oregon, and Washington. The whales migrate near shore along the coast of North America from Alaska to the central California coast starting in October or November. After passing Point Conception, California, the majority of the animals take a more direct offshore route across the southern California Bight to northern Baja California. The Eastern North Pacific stock winters mainly along the west coast of Baja California. The northbound migration generally begins in mid-February and continues through May with cows and newborn calves primarily migrating northward between March and June along the U.S. coast. In 1994 Eastern North Pacific gray whales were removed from the List of Endangered and Threatened Wildlife (i.e., it is no longer considered endangered or threatened under the ESA).

Subsistence hunters in Alaska and Russia have traditionally harvested whales from this stock. There was no reported takes by subsistence hunters in Alaska during the 1990s, with the most recent reported harvest occurring in 1989. Russian subsistence hunters reported taking no whales from this stock during 1998, 44 in 1994, and 85 in 1995. The 1995 harvest consisted of 40 females and 44 males, and one whale reported struck and lost. Based on this information, the annual subsistence take averaged 43 whales per year, during which time the population size increased. The current IWC quota for gray whales taken by aboriginals is 140 animals per year.

Western North Pacific Humpback Whale

Humpback whales in the North Pacific are seasonal migrants that feed on zooplankton and small schooling fishes in the cool, coastal waters of the Western United States, western

Canada, and the Russian Far East. The historic feeding range of humpback whales in the North Pacific encompassed coastal and inland waters around the Pacific Rim from Point Conception, California, north to the Gulf of Alaska and the Bering Sea, and west along the Aleutian Islands to the Kamchatka Peninsula and into the Sea of Okhotsk. Recent sitings indicate that the Bering Sea remains an important feeding area. Humpback whales have been known to enter the Chukchi Sea. The humpback whale population in much of this range was considerably reduced as a result of intensive commercial exploitation during the 20th century. The humpback whale is listed as "endangered" under the ESA, and therefore is designated as "depleted" under the MMPA. Subsistence hunters in Alaska have not been reported to take humpback whales. Noise pollution from the U.S. Navy's Low Frequency Active Sonar program and other anthropogenic sources (i.e., shipping) is a potential concern to the health of the humpback whale.

Minke Whale

In the North Pacific, minke whales occur from the Bering and Chukchi Seas south to near the Equator. Minke whales are relatively common in the Bering and Chukchi seas and in the inshore waters of the Gulf of Alaska. They are known to penetrate loose ice during the summer, and some individuals venture north of the Bering Strait. A July/August 1999 survey in the central Bering Sea resulted in 20 on-effort sightings of minke whales, most of which occurred along the upper slope in waters 100 to 200 meters deep. In the northern part of their range minke whales are believed to be migratory, whereas they appear to establish home ranges in the inland waters of Washington and along central California. Minke whales in Alaska are considered a separate stock from these "resident" minke whales in California, Oregon, and Washington. Minke whales are not listed as "depleted" under the MMPA or listed as "threatened" or "endangered" under the ESA. No minke whales were ever taken by the modern shore-based whale fishery in the eastern North Pacific which lasted from 1905 to 1971. Subsistence takes of minke whales by Native Alaskans are rare, but have been known to occur. Only seven minke whales are reported has having been taken for subsistence between 1930 and 1987. The most recent harvest (two whales) in Alaska occurred in 1989.

North Pacific Right Whale

Before right whales in the North Pacific were heavily exploited by commercial whalers, concentrations were found in the Gulf of Alaska, eastern Aleutian Islands, south-central Bering Sea, Sea of Okhotsk, and Sea of Japan. During 1958–1982, there were only 32–36 sitings of right whales in the central North Pacific and Bering Sea. Sightings have been reported as far south as central Baja California in the eastern North Pacific, as far south as Hawaii in the central North Pacific, and as far north as the sub-Arctic waters of the Bering Sea and the Sea of Okhotsk in the summer. Right whales calve in coastal waters during the winter months. However, in the eastern North Pacific no such calving grounds were ever found. Migratory patterns of the North Pacific stock are unknown, although it is thought that the whales spend the summer on high-latitude feeding grounds and migrate to more temperate waters during the winter months. Aerial and vessel surveys for right whales have occurred in recent years in a portion of Bristol Bay where right whales have been observed each summer since 1996. North Pacific right whales are observed consistently in this area, and are not observed on dedicated vessel or aerial survey

tracklines along the periphery of the area or outside the area. Right whales remain in the southeastern Bering Sea until at least through October, and have not been observed outside the localized area in the southeastern Bering Sea. The right whale is listed as "endangered" under the ESA, and therefore is designated as "depleted" under the MMPA. Subsistence hunters in Alaska are not reported to take right whales. Ship strikes and entanglement in fishing gear may be significant sources of mortality for the North Pacific right whales.

6.1.7 Terrestrial Animals

The economic value of hunting in Alaska annually exceeds $100 million, excluding the value of subsistence harvests. Trapping contributes several million each year to the economy and is extremely important to thousands of Alaskans lacking other sources of cash income. Wildlife viewing and photography are of great importance to over 85 percent of Alaskan residents and visitors to Alaska, based upon recent surveys. The tourism industry contributes over $1 billion annually to Alaska's economy and is the State's third largest industry. The Division of Wildlife Conservation within the ADFG has administrative oversight over Alaska's major game species, and participates via interagency coordination on land use planning (e.g., review and comment on DNR area plans) on habitat management issues, refuges and sanctuaries. ADFG oversees 14 species management programs for bison, black bear, brown bear, caribou, deer, elk, furbearers, marine mammals, moose, mountain goat, muskox, sheep, waterfowl and wolf. Species management programs involve both management and research projects. Some management projects involve active manipulation of wildlife populations to allow recovery of depressed populations. Habitat improvement projects range from the cultivation of wildlife food crops in Fairbanks and Delta to mechanical disturbance and prescribed burns in the Matanuska, Tanana, and Susitna River valleys. Species management programs contribute to the sustained yield management of the State's wildlife — a goal that is accomplished through collection and analysis of data on wildlife reproduction, survival, and mortality for use by the Board of Game in defining hunting and trapping regulations and by the department in developing effective management strategies. The terrestrial animals discussed below are intended to be representative samplings of potentially impacted species, and are not intended to be complete and exhaustive. They were selected in part based on their importance as subsistence resources.

6.1.7.1 Caribou

Caribou live in the arctic tundra, mountain tundra, and forests of Alaska. Caribou in Alaska are distributed in 32 herds (or populations). A herd uses a calving area that is separate from the calving areas of other herds, but different herds may mix together on winter ranges. Like most herd animals, the caribou must keep moving to find adequate food. Large herds often migrate long distances (up to 400 miles) between summer and winter ranges. Smaller herds may not migrate at all. In summer (May-September), caribou eat the leaves of willows, sedges, flowering tundra plants, and mushrooms. They switch to lichens (reindeer moss), dried sedges (grasslike plants), and small shrubs (like blueberry) in September. In Alaska, caribou prefer treeless tundra and mountains during all seasons, but many herds winter in the boreal forest (taiga). Calving areas are usually located in mountains or on open, coastal tundra. Caribou tend to calve in the same general areas year after year, but migration routes used for many years may

suddenly be abandoned in favor of movements to new areas with more food. Changing movements can create problems for the Native people in Alaska and Canada who depend upon caribou for food.

Caribou movements are probably triggered by changing weather conditions, such as the onset of cold weather or snowstorms. Once they decide to migrate, caribou can travel up to 50 miles a day. Caribou apparently have a built in compass, like migratory birds, and can travel through areas that are unfamiliar to them to reach their calving grounds.

Alaskan hunters shoot about 22,000 caribou each year for food. A few thousand other hunters, primarily from the lower 48 states, Europe, and Mexico, travel to Alaska to experience caribou hunting each fall. These hunters contribute significantly to the economy of the State, particularly in rural areas. Meat from caribou taken by these nonresident hunters is also required to be used for food. Alaska's great caribou herds have also become increasingly treasured as a natural wonder of State, national, and international importance.

There are approximately 950,000 wild caribou in Alaska (including some herds that are shared by Alaska and Canada's Yukon Territory). Caribou are somewhat cyclic in number, but the timing of declines and increases, and the size to which herds grow is not very predictable. Although overhunting caused some herds to remain low in the past, today, varying weather patterns (climate), overpopulation, predation by wolves and grizzly bears, and disease outbreaks determine whether most herds increase or decrease. (AK Fish and Game, www.adfg.state.ak.us, last viewed: 6/28/2005)

6.1.7.2 Muskoxen

Populations of muskoxen died out in the 1800s in the northern Alaska, but were reintroduced in the 1960s and 1970s. In the east, muskoxen were reintroduced to the Arctic National Wildlife Refuge in 1969 and to the Kavik River area (between Prudhoe Bay and the Refuge in 1970. In the west, they were reintroduced near Cape Thompson on the Chukchi coast in 1970 and 1977. The reintroductions to the east established the Refuge population, which grew rapidly and expanded both east and west of the Refuge. An estimated 270 muskoxen were counted between the Colville River and the Refuge, and a breeding population has been established in the area of the Itkillik-Colville rivers. A total population of about 2,300 muskoxen resides in Alaska. Muskoxen occur on coastal moist tundra.

During the summer, muskoxen live in wet areas, including river valleys. They move to higher elevations in the winter, to avoid deep snow. They graze on grasses, reeds, sedges, and other ground plants. Since green plants are available for only a few weeks during the arctic summer, for most of the year, muskoxen must paw through snow to feed on dried plants.

6.1.7.3 Moose

The Alaska moose is the largest of all the moose. In Alaska, they occur in suitable habitat from the Stikine River in the Panhandle to the Colville River on the Arctic Slope. They

are most abundant in recently burned areas that contain willow and birch shrubs, on timberline plateaus, and along the major rivers of Southcentral and Interior Alaska. Latest estimates put the population of moose in Alaska at about 160,000.

Because moose range over so much of Alaska, they have played an important role in the development of the State. Native Alaskan peoples have coexisted with the moose for thousands of years. Historically, moose were an important source of food, clothing, and implements to Athapaskan Indians dwelling along the major rivers. Athabascan peoples still use moose for many different things. They use the antlers, hide, hair, and the meat. The moose hide is tanned and softened and turned into moccasins, jackets, mittens, dresses, and ceremonial outfits. The hide can also be made into purses, picture frames, drums, and knife cases. Strips of rawhide could be used in the making of laces for snowshoes and straps for baby carriers. Antlers can be used for buttons, artwork, cribbage boards, tool handles, and bolo ties. Moose hair is hollow and ranges from pure white to dark brown. The hair decorates ceremonial masks and other craft items. All edible parts of the moose are used.
(http://www3.northstar.k12.ak.us/schools/awe/moose/moosepage.html)

Today, Alaskans and nonresidents annually harvest approximately 6,000 to 8,000 moose; approximately 3.5 million pounds of meat. Moose are an important part of the Alaskan landscape, and tourists photograph those animals that feed along the highway. The advent of increased development in Alaska has included many alterations upon the face of the land, which has created conflicts between man and moose as moose eat crops, stand on airfields, eat young trees, wander the city streets, and collide with cars and trains. Between 300 and 1000 moose are killed every year on Alaska's highways and railroad tracks. However, man's removal of mature timber through logging and careless use of fire has also benefited moose as new stands of young timber have created vast areas of high-quality moose food.
(http://www.adfg.state.ak.us/pubs/notebook/biggame/moose.php, last viewed: 6/28/05)

6.1.7.4 Grizzly/Brown Bears

Brown bears are found in a variety of habitats, from dense forests, to sub alpine meadows and arctic tundra. In Alaska, there are about 30,000 Brown bears, although in the lower 48 states they are considered endangered. They are not listed as endangered in Alaska. Compared to other areas where brown bears are found, the largest brown bears are found along the coast of Alaska and British Columbia, and islands such as Kodiak and Admiralty Islands. There, because of a consistent diet of high protein salmon, males average over 700 pounds and females average about 450 pounds. Despite this large size, brown bears are extremely agile and fast, reaching speeds of 35 to 40 miles per hour (mph).

Brown bears are omnivores and will eat both vegetation and animals. Grasses, sedges, roots, berries, insects, fish, carrion and small and large mammals are all part of a bear's diet. In some areas they have become significant predators of large hoofed mammals such as moose, caribou and elk. In other areas a large, consistent supply of food like salmon have led to behavioral changes that allow large congregations of brown bears to share an abundant resource.

The diet of brown bears varies depending on what foods are available in that particular season or habitat. Along the coast, they scavenge on the carcasses of marine mammals and prey on waterfowl eggs and young. They also feed on sedges and grasses, prey on arctic ground squirrels and rodents, and forage on plant roots and berries. (http://www.kidsplanet.org/factsheets/grizzly_bear.html, last viewed: 6/28/2005)

6.1.7.5 Black Bears

Black bears are the most abundant and widely distributed of the three species of North American bears. In Alaska, black bears occur over most of the forested areas of the State. They are not found on the Seward Peninsula, on the Yukon-Kuskowim Delta, or north of the Brooks Range. They are also absent from some of the large islands of the Gulf of Alaska, notably Kodiak, Montague, Hinchinbrook and others, and from the Alaska Peninsula beyond the area of Lake Iliamma. In Southeast Alaska, black bears occupy most islands with the exceptions of Admiralty, Baranof, Chichagof, and Kruzof. These are inhabited by brown bears. Both species occur on the southeastern mainland. Black bears are most often associated with forests, but depending on the season of the year, they may be found from sea level to alpine areas.

Black bears are creatures of opportunity when it comes to food. There are, however, certain patterns of food-seeking which they follow. Upon emergence in the spring, freshly sprouted green vegetation is their main food item, but they will eat nearly anything they encounter. Winter-killed animals are readily eaten, and in some areas black bears have been found to be very effective predators on newborn moose calves. As summer progresses, feeding shifts to salmon if they are available. In areas without salmon, bears rely primarily on vegetation throughout the year. Berries, especially blueberries, are an important late summer-fall food item.

At one time black bears were classified as furbearers and were heavily used as such. Now there is a growing appreciation for them as meat and trophy animal. In some areas of Alaska, black bears are a traditional subsistence food. In the community of Huslia, for instance, hibernating bears are killed, cooked, and eaten by the men and boys of the community in a traditional dinner. (Http://www.alaskan-adventures.com/alaska-black-bear.htm, last viewed: 6/29/2005)

6.1.7.6 Wolverine

The wolverine, a relative of the mink and weasel, is the largest terrestrial member of the family Mustelidae. Also known as devil bear, carcajou, or woods devil, its scientific name is *Gulo gulo*, meaning "glutton." Wolverines occur in small numbers throughout their range and require large expanses of wilderness. Formerly distributed across most arctic and sub arctic regions in North America, the wolverine has disappeared from most of the eastern United States and Canada. In Alaska, there have always been significant wolverine populations throughout mainland Alaska and some of the islands of Southeast Alaska.

The wolverine is valued by Alaskans as a fur resource and as a symbol of wilderness. Its fur is commonly used for parka trim and hoods because of its beauty and durability and because

the guard hairs of wolverine fur resist frost accumulation.

Wolverines are opportunistic, eating about anything they can find or kill. They are poor hunters but are well adapted for scavenging. Their diet reflects annual and seasonal changes in food availability. In the winter, wolverines primarily rely on remains of moose and caribou killed by wolves and hunters or animals that have died of natural causes. Throughout the year, wolverines feed on small and medium-sized animals such as voles, squirrels, snowshoe hares, and birds. In the right situations, wolverines can kill moose or caribou, but these occurrences are rare.

It appears that few wolverines live longer than five to seven years in the wild. Some, however, do survive to 12 or 13 years of age. The primary natural mortality factors are starvation and being killed by other predators, primarily wolves. However, most wolverine mortality is due to trapping by humans. The continued health of wolverine populations in Alaska is best assured by both protecting large expanses of wilderness and preventing over harvest. Wolverines prefer vast areas of wilderness, and preservation of their habitat is of key importance to their successful management. Much wolverine habitat is now protected in the State through various federal and State land dedication programs. Harvests are controlled by seasons and bag limits. Annual catches and the effects on the population are closely monitored by the ADFG that harvest by humans will not be a negative factor on Alaska's wolverine populations.

6.1.8 Birds

Alaska is host to 437 species of birds, with new species being reported regularly. The greatest variety of species comes from a few families, including waterfowl (44 species), shorebirds (37 sandpiper and nine plover species), gulls (17 species), alcids (16 species), birds of prey (16 species), wood warblers (12 species), thrushes (11 species), and owls (ten species).

Despite Alaska’s size, its northern location offers relatively few life zones. Three zones are recognized: The Canadian zone, characterized by the range of Sitka spruce forests; the Hudsonian zone, which includes the interior valleys and mountain bases identified by birch-spruce forests; and the arctic-alpine zone, which extends above the tree growth and is characterized by tundra or treeless vegetation. Within these life zones are diverse habitats ranging from oceanic islands to river deltas, temperate rainforests, deciduous and coniferous woodlands, mountain ranges (including 17 of the 20 tallest mountains in North America), arctic tundra, grassy plains, glaciers, and lakes, rivers and other wetlands.

The distribution of bird species throughout Alaska is tied to the seasons. Alaska represents the northern limit for many widespread species of birds, from the Great Horned Owl to the Savannah Sparrow. While shorebirds are plentiful, wading birds are rare; only the Great Blue Heron ranges into southcentral Alaska. While the bountiful Alaska summer provides resources for multitudes of breeding birds, the harsh winter flushes most birds from the frigid lands. Few species winter in Alaska; most are found there only during migration or the summer breeding season. Spring and fall migrations bring spectacular concentrations of birds.

Spring migration begins in early April and continues through early June with a peak of migration activity in May. Fall migration begins in late June, when some no-breeding sandpipers begin to return south from the arctic, while some gulls continue migrating through early December. However most fall migrations take place in August and September.

Four principle migration routes are recognized in Alaska: the interior, coastal, Pacific, and Siberian routes. The coastal migration route roughly follows the coastline and is used by many waterfowl, shorebirds and some songbirds. The Pacific migration route is used by birds wintering in South America and South Pacific Islands. The Siberian route is used by a few birds that winter in Asia, but breed in Alaska, like the Bluethroat, Northern Wheatear, Bar-tailed Godwit and Yellow Wagtail. (http://www.dced.state.ak.us/oed/student_info/learn/birding.htm, last viewed 6/30/2005)

The birds discussed below are intended to be representative samplings of potentially impacted species, and are not intended to be complete and exhaustive. They were selected in part based on their importance as subsistence resources.

6.1.8.1 Seabirds

Populations of seabirds in Alaska are larger and more diverse than in any similar region of the northern hemisphere. Seabirds, so named because they spend at least 80 percent of their lives at sea, are dependent upon marine resources for food. About 100 million seabirds reside in marine waters of Alaska during some part of the year. About half this population is composed of 50 species of nonbreeding residents, visitors, and breeding species that use marine habitats only seasonally. Another 30 species include 40–60 million individuals that breed in Alaska and spend most of their lives in U.S. territorial waters. Alaskan populations account for more than 95 percent of the breeding seabirds in the continental United States, and eight species nest nowhere else in North America. Another five species range through the North Pacific, but their populations are concentrated in Alaska. In addition to breeding grounds, Alaskan waters also provide important wintering habitat for birds that breed in Canada and Eurasia. Shearwaters, which breed in the southern hemisphere, are the most numerous species in Alaskan waters during the summer.

Collectively, seabirds use a wide range of coastal habitats for nesting, but common characteristics of all nesting habitats are safety from mammalian predators and availability of marine prey near nesting colonies. Most seabirds nest on offshore islands or mainland coastal cliffs. Seabird nest sites include rock ledges, open ground, underground burrows, and crevices in cliffs or talus. The catalog of known breeding sites includes more than 1,300 colonies around the coast, ranging in size from a few birds to more than 2.5 million. Seabirds take a variety of prey from the ocean, including krill, small fish, and squid. Suitable nest sites and oceanic prey are the most important factors controlling the natural distribution and abundance of seabirds. The seas near Alaska (the Arctic Ocean, Bering Sea, Gulf of Alaska, and north Pacific Ocean) are very rich and produce large amounts of food for the birds. Most species of seabirds nesting in Alaska feed within 50 km of breeding grounds.

The most abundant breeding species in Alaska are northern fulmars, storm-petrels, kittiwakes, murres, auklets and puffins. These species also form the largest colonies. Fulmars, storm-petrels, and kittiwakes are surface feeders, picking their prey from the surface or just below the surface; murres, auklets, and puffins dive for their food. Fulmars nest primarily on island groups in and around the Bering Sea. They take a wide variety of prey (e.g., fish, squid zooplankton, jellyfish) from the surface or just below the surface. Storm-petrels are strictly nocturnal and nest below ground in either burrows or crevices between rocks. They forage on zooplankton and squid; in some areas they are dependent upon small fish such as capelin and sand lance caught at the surface. Black-legged kittiwakes are widespread throughout Alaska, while red-legged kittiwakes are found only in the Bering Sea region. Both are surface feeders although black-legged kittiwakes feed primarily on small fish and forage over the continental shelf and shelf break; red-legged kittiwakes feed primarily on myctophids and will forage beyond the shelf break. Murres nest on cliffs around the coast of Alaska, forming large colonies. They forage over the continental shelf and will dive up to 300 feet for prey (primarily fish during the breeding season and zooplankton during the winter). Six species of auklets nest in Alaska, four of which (Least, Crested, Whiskered and Parakeet) nest only in the Bering Sea region. Least auklets are the most abundant breeding seabird in Alaska; approximately one-fifth of the State's total breeding seabirds.

Auklets forage across the continental shelf; however, they are attracted to "fronts" between water masses where food is concentrated. They feed on zooplankton, usually diving to moderate depths, but can dive up to 250 feet. Puffins breed throughout Alaska, where their populations are concentrated. Puffins generally forage near their breeding colonies and while their diet is broad over the course of the year, puffins depend upon fish to feed their young. (Meehan, et.al. 1998)

Little information is available to assess numerical changes for most seabird species in Alaska. It is known that some species were seriously reduced or locally extirpated by foxes introduced to islands in the 1800's and early 1900's. About 450 islands from southeastern Alaska to the western Aleutians were used as release sites for arctic and red foxes. The species most affected included open ground nesters such as gulls, terns, and fulmars, and burrowing birds like ancient murrelets, Cassin's auklets, tufted puffins, and storm-petrels. In spite of natural die-offs and eradication efforts, foxes remain on about 50 islands to which they were introduced.

Recent counts suggest that fulmars are increasing at two of their seven major colonies (Semidi Islands and Pribilof Islands), and several small colonies have been established since the mid-1970's) Counts of least and crested auklets also indicate possible increases at two colonies in the Bering Sea. Red-faced cormorants declined about 50 percent on the Semidi Islands between 1978 and 1993, while pelagic cormorants increased on Middleton Island between 1956 and the mid-1970's. Glaucous-winged gulls increased on Middleton from non breeding in 1956 to more than 20,000 birds in 1993; this species has also shown marked increases following removal of introduced foxes at several sites in the Aleutian Islands. Marine bird surveys in Prince William Sound suggest that arctic terns, glaucous-winged gulls, pelagic cormorants, horned puffins, and pigeon guillemots have all declined in that area. Terns and guillemots have recently increased on several Aleutian Islands following fox removal.

Important threats to Alaska's seabirds include oil pollution, the introduction of predators to nesting islands, conflicts with commercial fisheries, and disturbance or habitat loss associated with human population growth in coastal areas. There is little doubt, however, that the introduction of exotic animals, especially foxes, but also rats, voles, ground squirrels, and rabbits has been the most damaging source of direct mortality associated with human activity. Unlike one-time catastrophes, introduced predators exert a continuous negative effect on seabird populations. Another important influence on seabird populations is changes in food supply, whether natural or related to human activity. The postwar period from 1950 to the 1990's has seen explosive growth and constant change in commercial fisheries of the northeastern Pacific. Driving these changes, or in some cases possibly driven by them, are major shifts in the composition of marine fish stocks. In the Gulf of Alaska, for example, a shift occurred in the late 1970's and early 1980's toward greater abundance of groundfish (cod, various flatfishes, and especially walleye pollock), possibly at the expense of small forage species such as herring, sandlance, and capelin. Coincident with these changes, diets of a variety of seabirds such as murres, murrelets, and kittiwakes have shifted from being predominantly capelin-based to pollock-based. Seabird declines and breeding failures correspond to the shift, as do drastic declines in harbor seals and northern sea lions in the Gulf of Alaska. The wholesale removal of large quantities of fish biomass from the ocean is likely to have major, if poorly understood, effects on the marine ecosystem. (Hatch and Piatt)

Subsistence harvest of seabirds is conducted by residents of coastal villages throughout the Bering Sea region. These villages are remote and have limited employment opportunities; consequently, many residents rely on subsistence resources. The relative use of seabirds depends in part on proximity to the resource; a study of bird hunting in Savoonga and Gambell over the course of year found that nearly all households used birds. Seabirds and their eggs, while a small portion of the overall subsistence diet, provide variety, particularly in the spring. Seabirds may also provide an important food resource in years when other resources are limited. Seabird hunting and egg gathering are activities generally done in family groups. These activities help to maintain family ties and provide cultural identity. Furthermore, the gathering activities are viewed both as food gathering and essentially as social and recreational activities. The use of seabird resources extends beyond the region, as trade and barter are integral parts of the subsistence lifestyle; consequently, resources specific to certain regions or areas are used to trade for other resources that are not available locally.

While tourism activities directly related to seabirds may be minimal in the region, they can be important locally. Annually, many groups visit the Pribilof Islands to enjoy the spectacle of large and diverse seabird populations. This tourism is important to the local economy. In addition, the local Native corporation, in cooperation with the USFWS, supports a science camp for young people to learn from their elders and others about the local environment. The camp, while being of great educational value, also provides income to the local area and important diversity to the local economy. (Meehan, et.al.1998)

6.1.8.2 Shorebirds

Because of its size, northerly position and pristine habitats, Alaska provides breeding habitat for more shorebirds than any other state in the United States. Seventy-one species of shorebirds (one-third of the world's species) occur in Alaska; 37 of these regularly breed there while nine others breed irregularly, or annually but in small numbers. Alaska is unique in that it hosts most of the world's population of three shorebird species, entire populations of five supspecies, and large portions of North American populations of six other species or subspecies. In total, Alaska hosts between seven and 17 million shorebirds, or as much as 50 percent of all the shorebirds that occur in North America. Using the species prioritization process developed for the U.S. Shorebird Plan, 14 species or subspecies occurring in Alaska are considered Birds of Conservation Concern by the USFWS.

For almost all of the shorebirds occurring in Alaska, coastal habitats are critical during some phase of their annual cycle, particularly during the nonbreeding period. With respect to critical habitat, Alaska has over 50 shorebird migration staging or stopover sites that qualify as Western Hemisphere or East Asian-Australasian Shorebird Reserve Network sites. At ten of these sites concentrations exceed one million birds, with sites like the Copper River Delta hosting between five and eight million shorebirds each spring. The Yukon-Kuskokwim Delta likely supports an equal number of shorebirds, but they occur mostly during summer and autumn. The world's largest aggregations of shorebirds are thought to occur on the Copper River Delta.

This vast network of migration sites coincides with the arrival and exodus of shorebirds to and from Alaska during each spring and fall. Only six of the 43 taxa that regularly occur in Alaska winter there. However of these 43 regularly occurring taxa, some portion of the populations of 38 winter outside the United States while entire populations of 18 others migrate to Central and South America or East-Asia-Australasia and South Pacific countries (Oceania). Alaska's shorebirds are not only a national resource, but they provide international links to over 40 countries distributed on five continents. Below is a description of four broad areas

In the low-lying northern Arctic plains and mountains, where freezing and thawing form a patterned mosaic of polygonal ridges and ponds and many rivers bisect the plain and flow into the Arctic Ocean, waterfowl and shorebirds dominate the avian community and passerines are scarce. The most abundant breeding birds on the coastal plain include Northern Pintail, King Eider, Oldsquaw, American Golden-Plover, Semipalmated Sandpiper, Pectoral Sandpiper, Red-necked Phalarope, and Lapland Longspur. Several Old World species, including the Arctic Warbler and Bluethroat, penetrate the region from the west. Taiga passerines such as Gray-cheeked Thrush and Yellow Warbler reach the region along drainage systems, and raptors including Gyrfalcon and Rough-legged Hawk nest commonly along major rivers. Few bird species winter in the region.

In the Subarctic Coastal Plain of western Alaska and the Alaska Peninsula Mountains, wet and mesic graminoid herbaceous communities dominate the lowlands and numerous ponds, lakes, and rivers dot the landscape. High densities of breeding waterfowl and shorebirds are found on the coastal plain of the Yukon and Kuskokwim rivers. Intertidal areas here and lagoons of the north side of the Alaska Peninsula supports millions of shorebirds during

migration, including Dunlin, Western Sandpiper, Red Knot, and Bar-tailed Godwit. The coast of the Alaska Peninsula supports high concentrations of wintering sea ducks including Steller's Eider, Harlequin, Oldsquaw, Surf Scoter, and Black Scoter. Passerine diversity is greatest in tall, riparian shrub habitats, where Arctic Warbler, Gray-cheeked Thrush, and Blackpoll Warbler nest. Gyrfalcon and Rough-legged Hawk nest along the riverine cliffs. Mainland sea cliffs are occupied by nesting colonies of Black-legged Kittiwake, Common Murre, and Pelagic Cormorant.

The Aleutian Islands, extend westward from the Alaskan mainland for 1,100 miles, and the Bering Sea islands including the Pribilofs, St. Matthew, Hall, St. Lawrence, and Little Diomede. Meadows and marshes of herbs, sedges, and grasses are plentiful and some islands have ericaceous bogs. The breeding diversity of passerines (mainly Lapland Longspur, Snow Bunting, and Gray-crowned Rosy-Finch), and shorebirds (including Black Oystercatcher, Dunlin, Ruddy Turnstone, and Rock Sandpiper) is low. However, McKay's Bunting, the only endemic Alaskan passerine, is restricted to this area.

The coastal North Pacific rainforest, which stretches from the western Gulf of Alaska all the way south through British Columbia and the Pacific Northwest to northern California provides critical breeding, wintering, and migration habitat for internationally significant populations of waterfowl and other wetland-dependent species. The area includes major stopover sites for migrating shorebirds, especially Western Sandpipers and Dunlins. Black Oystercatchers, Rock Sandpipers, Black Turnstones, and Surfbirds are common wintering species. Nearshore marine areas support many breeding and wintering sea ducks. Many seabirds breed on offshore islands, including important populations of Ancient Murrelet, Rhinoceros Auklet, Tufted Puffin, Common Murre, Western and Glaucous-winged Gull, and Leach's Storm-Petrel. Pelagic waters provide habitat for large numbers of shearwaters, storm-petrels, alcids, and Black-footed Albatross. (http://www.abcbirds.org, Last viewed: 7/7/2005)

The Migratory Bird Treaty Act (16 U.S.C. 703-711) and the Fish and Wildlife Act of 1956 (16 U.S.C. 742d) designate the Department of the Interior (DOI) as the key agency responsible for the management of migratory bird populations frequenting the United States and for the setting of harvest regulations that allow for the conservation of those populations. The Migratory Bird Treaty Act Protocol Amendment (1995) (Amendment) provides for the customary and traditional use of migratory birds and their eggs for subsistence use by indigenous inhabitants of Alaska. DOI monitors the subsistence harvest in Alaska through the use of annual household surveys in the most heavily used subsistence harvest areas (e.g., Yukon-Kuskokwim Delta), which help the agency gather information on the annual subsistence harvests of up to 53 species of birds, including geese, ducks, swans, cranes, loons, seabirds, shorebirds, and upland game birds. These surveys are conducted by local village resident surveyors in the subsistence eligible areas of Alaska. The resulting estimates of harvest per household are combined with the complete list of households in the subsistence-eligible areas to provide estimates of the total annual harvest of the up to 53 species of birds.

Recent data on subsistence harvests, available from most of the subsistence-eligible areas of Alaska between 1995 and 2000, indicate an average annual harvest of 236,000 migratory

birds. These include geese, ducks, swans, cranes, seabirds and shorebirds. Approximately 80 percent of this harvest was in western coastal Alaska (from Kivalina in Northwest Arctic Alaska to Port Heiden on the Alaska Peninsula). The remainder of the harvest took place in interior and southern coastal Alaska. Available data indicated that 70 percent of total annual subsistence harvest occurs in spring and summer. In most areas, 65-85 percent of all birds taken are taken in the spring and summer. However, in the Upper Tanana River (Tok) area, and most places in south coastal Alaska, the bulk of the harvest is taken during fall and winter. Highest annual spring and summer harvests occur on the Yukon-Kuskokwim Delta.

Recent data indicate that, of the entire Alaska spring-summer average subsistence harvest of 165,000 birds between 1995 and 2000, 80,000, or 48 percent, were taken on the Yukon-Kuskowim Delta. Next highest spring-summer harvests were in the Bering Strait region, (27,000 birds) followed by Bristol Bay and the Northwest Arctic region, which each had reported takes of about 18,000 birds. (No complete recent survey data are available for the North Slope). The Yukon-Kuskokwim Delta is also the place of highest fall harvests of migratory birds. Recent data show that, between 1995 and 2000, of the 71,000 birds taken in the subsistence-eligible areas beginning in September, 28 percent (20,000 birds) were taken on the Yukon-Kuskokwim Delta. Other high fall harvests were in the Bering Strait region (14,000 birds), Kodiak Island (10,000 birds), and in Bristol Bay and the Aleutian-Pribilof Islands (8000 birds each).

The migratory birds taken in greatest quantities in the subsistence-eligible areas were pintails and mallards (22,000 birds each, annual average) followed by lesser Canada geese (20,000 birds). Next in magnitude were cackling Canada geese (15,000 birds), Pacific white-fronted geese (15,000 birds), black scoters (11,000 birds), and black brant (10,000 birds). Large quantities of pintails, mallards, and black brant were taken in several of the subsistence eligible areas between 1995 and 2000. Most of the lesser and cackling Canada geese, the Pacific white-fronted geese, and the black scoters were taken on the Yukon-Kuskokwim Delta.

Migratory bird eggs are also an important part of the subsistence diet, particularly in the coastal areas. According to available data, 115,000 eggs were taken annually, on average, in the subsistence-eligible areas between 1995 and 2000. About 89 percent of the egg harvest occurred in western coastal Alaska. The rest took place in the Aleutian-Pribilof Islands and on Kodiak Island. The Bering Strait region is the area of highest harvest of migratory bird eggs. Available data indicate a harvest of 41,000 eggs from the Bering Strait region, the majority being murre eggs. The Bristol Bay region took the next highest number of bird eggs: 28,000 eggs, most of them gull eggs. This is followed by Northwest Arctic Alaska and the Yukon-Kuskokwim Delta, which each took 14,000 eggs on average. In Northwest Arctic Alaska, most of the eggs taken were gull eggs, followed by murre eggs, whereas on the Yukon-Kuskokwim Delta, most of the eggs taken were waterfowl eggs. For the subsistence-eligible areas as a whole, 83 percent of all migratory bird eggs taken were those of murres, gulls, or other seabirds. Another 15 percent were waterfowl eggs. The remaining two percent were eggs of loons and shorebirds. Over half of the waterfowl eggs taken between 1995 and 2000, were taken on the Yukon-Kuskokwim Delta. Most of the rest were taken on the Bering Strait mainland, followed by Northwest Arctic Alaska and Bristol Bay. (http://alaska.fws.gov/ambcc/ambcc/Harvest/subharvweb.pdf), Last viewed: 7/7/2005)

6.1.8.3 Bald Eagle

The Bald Eagle is Alaska's largest resident bird of prey (the Steller's Sea Eagle is larger) with a wing span up to seven and a half feet long, and weights of eight to 14 pounds. Like many raptors, females are larger than males. The Bald Eagle is so named for its conspicuous white head and tail. The distinctive white adult plumage is not attained until five or more years of age. Immature birds lack this easily identifiable characteristic and can be confused with the Golden Eagle. The immature Bald Eagle's unfeathered tarsi (lower legs) and whitish wing linings on the forward part of the wings can be helpful distinctions where the two species coexist.

Found only in North America, Bald Eagles are more abundant in Alaska than anywhere else in the United States. The Alaska population has been estimated to include 30,000 birds at the time of fledging. Bald Eagles are often found along Alaska's coast, offshore islands, and interior lakes and rivers. The highest nesting densities occur on the islands of Southeast Alaska. Admiralty Island is home to the densest nesting population of bald eagles known in the world. Most Bald Eagles winter in southern Alaska, but some leave the State during cold months. In the Chilkat Valley, over 3,000 birds may congregate in late fall and early winter to feel on spawned-out salmon.

Bald Eagles often use and rebuild the same nest each year. Nest trees are usually close to water, afford a clear view of the surrounding area, and often provide sparse cover above the nest. In southeast Alaska, Bald Eagles usually nest in old-growth timber along saltwater shorelines and mainland rivers. Eagles in south-central Alaska nest in old cottonwood trees near water. Nest building begins in April, and both the male and female gather nest material. In late April, two (sometimes three) dull white or creamy yellow eggs are laid several days apart. Incubation lasts about 35 days. When the young hatch, sibling rivalry is common and the weaker, usually the younger, chick is killed or starved. The surviving young leave the nest after approximately 75 days. They do not attain adult plumage and breed until four or five years of age. After the breeding season, Bald Eagles congregate where food is plentiful, and they may continue to roost near the nest tree.

Reproductive success can be affected by pesticides in the eagles' prey. Alaska Bald Eagles seem to be reproductively healthy, but contaminants have been recorded in Alaska fish populations and in Bald Eagles. A greater threat to Alaska's Bald Eagle population is destruction of their nesting habitat and nest disturbances. Nest trees tend to be the largest in the stand and
are usually 400 years old. In treeless areas on the Aleutians, nests are located on rock pinnacles, or they may be on the ground.

Fish are the main diet of the Bald Eagle. Herring, flounder, pollock, and salmon are taken along the coast, while the interior populations prey heavily upon salmon. Eagles also prey upon waterfowl, small mammals, sea urchins, clams, crabs, and carrion.

Claims by fox farmers and fishers of eagle depredations caused the Alaska Territorial

Legislature in 1917 to impose a bounty system on eagles. These claims were later found to be mainly false, but over 100,000 eagles were killed before the bounty was removed in 1953. With statehood in 1959, the Bald Eagle in Alaska received federal protection under the Bald Eagle Protection Act of 1940. This act made it illegal to kill or possess an eagle, alive or dead, or to possess any part of an eagle, including feathers. Bald Eagles were endangered or eliminated throughout most of the Lower 48 states as a result of habitat destruction, illegal shooting, pesticides, and poisoning. Bald Eagle populations are recovering in many states because of strong support for protection of endangered species wildlife habitat. Alaska's populations remain healthy, but careful stewardship and conservation of nesting habitat and salmon spawning streams as well as minimizing human disturbance near nest sites is necessary in order to protect Alaska's Bald Eagles from the potential harm caused by increasing human development. (Http://www.adfg.state.ak.us/pubs/notebook/bird/eagles.php, last viewed: 6/30/2005)

All birds of prey–hawks, falcons, eagles, and owls–are protected by federal regulations, and it is unlawful to possess any raptor (dead or alive) or any portion of one, including its feathers and talons. However the traditional and continuing subsistence use of snowy owls in Alaska is recognized. Federal and State regulations allow these raptors or their eggs to be taken for food or their skins for clothing. There is no closed season and no bag limit on snowy owls, when they are used for food or clothing, in five of Alaska's game management units in southwestern, western, and arctic Alaska.

Further, the USFWS, which has management authority for birds of prey, has established a national "feather bank" in Denver, Colorado, wherein eagle feathers are deposited. Feathers are distributed by the Federal government to American Indians and Native Alaskans who may request their use for religious or cultural ceremonies.

In Alaska, birds of prey historically played a significant part in the lives of Natives throughout the State. Perhaps the most widely known part played by raptors in Native life is that of the eagle in the culture of the Tlingit Indians of southeastern Alaska. Birds are of great importance in Tlingit legends; the Creator (Raven) was a bird, and according to Tlingit prehistory, people come from birds. The two moieties, or sides of the Tlingit peoples are the Raven and the Eagle (in southern portions of Tlingit territory). The Eagle also serves as the symbol for a number of clans within each moiety. (http://www.wildlife.alaska.gov/index.cfm?adfg=birds.raptors, last viewed: 6/30/2005)

6.1.9 Threatened and Endangered Species

Alaska is unique among the states in retaining nearly all of its native animals and plants in their natural diversity and abundance. The State's geographical isolation, relatively recent growth in population, limited development, small agricultural industry, and conservative laws governing the introduction and importation of exotic animals all contribute to this favorable condition. Many species that are rare, endangered, or have been extirpated elsewhere in the United States are thriving in Alaska. Examples include grizzly (or brown) bears, gray (or timber) wolves, bald eagles, caribou, peregrine falcons, marten, lynx, river otters, wolverines,

loons, and trumpeter swans. In Alaska, there are approximately 31,000 grizzly bears, 7,500 gray wolves, 40,000 bald eagles (80 percent of the entire United States' population of this species), 150,000 sea otters, and nearly one million caribou. A list of the federally endangered, threatened, proposed, candidate, and delisted Alaska species is provided below, along with their ranges. Where these species have not been described previously, additional information is provided following the chart.

CHART A: ENDANGERED, THREATENED, PROPOSED, CANDIDATE, AND DELISTED SPECIES IN ALASKA, (as of June 2004)**

SPECIES MANAGED BY U.S. FISH AND WILDLIFE SERVICE

SPECIES AND STATUS	DATE OF STATUS	CRITICAL HABITAT DESIGNATED ON	LEAD OFFICE	RANGE IN ALASKA
Endangered				
Short-tailed albatross (*Phoebastria albatrus*)	7/31/00	n/a	Anchorage	U.S. Territorial waters, Gulf of Alaska, Aleutian Islands, Bering Sea Coast, Japan, Russia, high seas
Eskimo curlew (*Numenius borealis*)	3/11/67	n/a	Fairbanks	No longer occurs in Alaska
Aleutian shield fern (*Polystichum aleuticum*	2/17/88	n/a	Anchorage	Adak Island
Threatened				
Spectacled eider *(Somateria fischeri)*	5/10/93	2/6/01	Fairbanks	Western and Northern Alaska (coastal)
Steller's eider *(Polysticta stelleri)*	6/11/97	2/2/01	Fairbanks	Southwestern, Western and Northern Alaska
Northern sea otter *(Enhydra lutris kenyoni)* (Southwest Alaska Population)	2/11/04	n/a	Anchorage	Aleutian Islands, Alaska Peninsula, Kodiak Island
Candidate				
Kittlitz's Murrelet *(Brachyramphus brevirostris)*	4/4/04	n/a	Anchorage	Coastal waters in southern and northwestern Alaska
Delisted				
Arctic peregrine falcon (*Falco peregrinus tundrius*)	10/5/94	n/a	Fairbanks	Northern and Western Alaska
American peregrine falcon *(Falco peregrinus anatum)*	8/25/99	n/a	Fairbanks	Interior Alaska
Aleutian Canada Goose (*Branta canadensis leucopareia)*	3/20/01	n/a	Anchorage	Aleutian Islands., Semidi Islands

SPECIES MANAGED BY NOAA MARINE FISHERIES SERVICE*

SPECIES AND STATUS	FREQUENCY OF OCCURRENCE	RANGE IN ALASKA

Endangered		
Stellar sea lion (*Eumetopian jubatus)* west of 144°	Regular	Bering Sea, N. Pacific
Blue whale (*Balaenoptera musculus)*	Rare	Bering Sea, Gulf of Alaska, N. Pacific
Bowhead whale *(Balaena mysticetus*)	Regular	Chukchi Sea, Beaufort Seas
Fin whale (*Balaenoptera physalus)*	Regular	Chukchi Sea, Bering Sea, Gulf of Alaska, N. Pacific
Humpback whale (*Megaptera novaeangliae*)	Regular	Bering Sea, Gulf of Alaska, N. Pacific
North Pacific right whale (*Eubalaena japonica*)	Rare	Bering Sea, Gulf of Alaska, N. Pacific
Sperm whale (*Physeter macrocephalus*)	Regular	Bering Sea, Gulf of Alaska, N. Pacific
Sei whale (*Balaenoptera borealis*)	Rare	Gulf of Alaska, N. Pacific
Leatherback sea turtle *(Dermochelys coriacea*)	Rare	Gulf of Alaska
Threatened		
Stellar sea lion (*Eumetopias jubatus*) east of 144°	Regular	Bering Sea, Gulf of Alaska, N. Pacific
Loggerhead sea turtle (*Caretta caretta*)	Rare	Gulf of Alaska
Green sea turtle (*Chelonia mydas*) (incl. *Agassizi*)	Rare	Gulf of Alaska
Proposed		
None		
Candidate		
None		
Delisted		
Gray whale (*Eschrichtius robustus*)	Regular	Chukchi Sea, Bering Sea, Gulf of Alaska, N. Pacific

*A number of listed trout and salmon species that spawn in the lower Pacific Northwest states may occur in Alaskan water in Alaskan waters during the marine phase of their life cycle. For information on these, see the NMFS Northwest Region website: http://www.nwr.NOAA.gov.
**(updated as of 9/8/2005)
(USFWS Website)

6.1.9.1 Short Tailed Albatross

The largest of the North Pacific albatrosses, adult Short-tailed Albatross have prominent pink bills, white-bodies, and a yellow wash on the head. Immature birds are dark, and can be distinguished from Black-footed Albatross by their pink bill and flesh colored feet. Adults can reach wingspans of over seven feet.

Once abundant in the North Pacific Ocean, the Short-tailed Albatross was nearly driven to extinction by the commercial feather trade at the end of the 19th century and beginning of the 20th century. Short-tailed Albatross were devastated by the demand for feathers, which were used in down insulation and for decorating ladies' hats. The largest remaining breeding colony of Short-tailed Albatross is located on Torishima Island, a volcanic island peak rising out of the Pacific Ocean south of Japan. A small number of birds (under 100 individuals) breed on the uninhabited island of Minami-kojima, just north of Taiwan. In recent decades, individual birds (of both sexes) have been reported among breeding Laysan and Black-footed albatrosses on Midway Atoll, but these birds have not bred successfully.

Short-tailed Albatross travel the North Pacific as far as the Bering Sea after the breeding season (the northern summer). South of the waters off Alaska the species has been sighted fewer than 30 times along the Pacific coast south to California. It is estimated that there are roughly 1,200 individuals left in the world, a dangerously low number for any species. A visitor to the island of Torishima in 1889 estimated that there were over 100,000 breeding pairs on the island. Only 40 years later, there were no breeding birds on the island. The population this is growing

on Torishima today seems to have been founded by juvenile birds that remained at sea while the last breeding adults were killed in the 1930s.

Returning to their breeding sites around October, Short-tailed Albatross on Torishima Island build their nests on relatively steep but open slopes. Grass is employed in nest construction. Like many other seabirds, only one egg is laid per pair, and both sexes share responsibility for incubating the egg, and feeding the young. Short-tailed Albatross feed on shrimp, squid and fish. They are not known to follow boats, like some other albatross species.

Due to their extremely small population size and very restricted breeding distribution, Short-tailed Albatross are quite vulnerable to any threats. The main breeding colony is found on an active volcanic island, which has erupted as recently as the 1940s. Heavy rain and even typhoons can be a threat to breeding birds, and can erode the volcanic ash slopes of the colony sites. Although rats are present on the island, they do not seem to pose a threat to the albatross eggs or juveniles. Feral cats and dogs have been removed from breeding islands, but would pose a threat if introduced. Short-tailed Albatrosses have been killed occasionally in long-line fisheries in the Pacific and loss of any individuals of this exceptionally rare species is a serious threat.(http://audubon2.org/webapp/watchlist/viewSpecies.jsp?id=188, Last viewed: 7/7/2005)

6.1.9.2 Eskimo Curlew

Once called a “doughbird” for the thick layer of fat developed for migration, the eskimo curlew is a long-legged wading bird, measuring 12 to 14 inches in length and weighing one pound. Adults are mottled brown on the back, with a white throat and yellowish-buff undersides. A buff-white eyebrow divides the dark crown from the eyeline and the bill is thin, curving downward over its two in length. Cinnamon colored wing linings are visible in flight and the stilt-like legs are dark green to blackish-gray. In the spring it feeds robin-like on berries and insects, especially ants, grasshoppers and their eggs. Snails are added to the menu in the winter. (http://www.dec.state.ny.us/website/dfwmr/wildlife/endspec/escufs.html, last viewed: 7/7/2005)

Eskimo Curlews formerly bred in the tundra and woodland transition zones of the Mackenzie District in the Northwest Territories, and possibly occurred as far west as Alaska or even Siberia. Eskimo Curlews arrived in their breeding grounds in late May, and quickly established nesting territories. The breeding habitat consisted of treeless upland tundra with dwarf shrubs and grassy tundra meadows. From mid to late June, clutches of four eggs were laid in nests in shallow depressions scraped in the ground. The birds were presumably monogamous (each male mated with one female), as in related species, with incubation shared by both parents. The young hatched from early to mid July and as other North American shorebirds, were precocial (left the nest with the parents within a day or two of hatching and fed themselves from the first day). They were ready to migrate by the end of the month. Only one brood was raised per
season. Nothing is known about breeding age, nest success, or adult and juvenile mortality, but closely related species usually do not breed until three years old and are long-lived (ten to more than 30 years).

During fall migration (July to October), most of the birds flew eastward to the Ungava Peninsula, then down the east coast to the Gulf of St. Lawrence. They staged primarily in Labrador and Newfoundland and in some years in Ontario, Quebec, the Maritimes and the New England states. The curlews usually flew non-stop from Labrador and Newfoundland over the Atlantic to South America, presumably wintering primarily on the pampas of Argentina but also in Uraguay and further south. During fall migration, the birds used a variety of coastal and terrestrial habitats. They fed in areas of crowberry, salt marsh, meadows, pastures, old fields, intertidal flats and sand dunes. During the winter in the pampas of Argentina, they used treeless grasslands with wetlands and may have used wetter grasslands and intertidal areas. In spring, the curlews were found in tallgrass and eastern mixed-grass prairies, often in areas disturbed by recent fires, areas near water disturbed by grazing bison, and in cultivated fields. Present day habitat use is unknown. In April and May, the returning flocks followed a more western route, moving northwards along the Pacific coast of South America, across Central America and the Gulf of Mexico, through Texas and the midwestern states, with some birds in the Canadian prairies.

Eskimo Curlews were hunted extensively because they were considered a delicacy, traveled in large dense flocks, were unafraid of humans, and had the habit of circling back within guns range when some members of the flock were shot. These characteristics made them particularly easy to harvest. Uncontrolled hunting during spring and fall migration is probably the most important reason for the drastic decline in numbers. In the fall, thousands were shot in Labrador, and many thousands were killed in New England when birds were forced to land by storms. Each spring huge numbers were shot in the Great Plains of the United States by market hunters. The role of habitat loss or of other possible limiting factors cannot be assessed, but habitat loss and alteration (e.g., conversion of grasslands to croplands) at staging sites in Canada and the United States and in wintering areas in South America may have contributed to the specie's decline.

The Eskimo Curlew has been protected under the Migratory Birds Convention Acts of both Canada and the United States since 1917. All shorebirds have been protected in the Buenos Aries province of Argentina since 1927. The birds were covered under the Migratory Birds Convention between the United States and Mexico in 1936 and included in the ESA of 1973. They are protected by the Ontario Endangered Species Act of 1971. Part of the historic breeding range in Canada is protected in the Anderson River Migratory Bird Sanctuary established by the Federal government in 1961. Probable breeding habitat is also protected in the Kendall Island Bird Sanctuary in the Northwest Territories. In all provinces and in the Yukon, the birds are further protected through provincial Wildlife Acts.
(http://www.speciesatrisk.gc.ca/search/speciesDetails_e.cfm?SpeciesID=21, last viewed: 7/7/2005)

6.1.9.3 Aleutian Shield Fern

On the botanical front, the Aleutian shield fern (Polystichum aleuticum) became Alaska's first, and so far only, listed plant in 1988. Although this small plant has probably long been rare,

the introduction of grazing animals (reindeer and caribou) onto Adak Island, the only place where it occurs, has taken a toll on fragile alpine habitat near where the fern is found. The USFWS is working with the Navy, which manages part of the habitat, to fence the remaining ferns. Scientists have tried but so far failed to develop cultivation techniques for use in the propagation of Aleutian shield ferns for eventual reintroduction into native habitat.

6.1.9.4 Spectacled Eider

An unmistakable seaduck with diagnostic pale feather "goggles" around each eye, the Spectacled Eider breeds along the coast of Alaska and Russia. Male Spectacled Eiders in breeding plumage are magnificent with their black-and-white body, green head, orange bill and prominent white patches around each eye. Females have subtle tan and brown barred plumage. A little smaller than the Common and King eiders, the Spectacled Eider is easily distinguished from these in any plumage by its "goggles".

The Spectacled Eider is found only within a restricted arctic range, and lives in the arctic region throughout the year. They are found along the northern coast of Russia and Alaska and down the coast of western Alaska (above the Aleutian Chain). The Spectacled Eider breeds near the coast, and spends the non-breeding season at sea. Nesting sites are typically located immediately adjacent to water bodies.

Nest building occurs with the break-up of winter ice. Spectacled Eiders arrive from their wintering grounds already paired for breeding. Females may modify an old nesting site, or will create a new nest bowl shortly before laying the first egg. Nesting sites are usually located on small islands, peninsulas and raised areas in coastal marshes. Nests are lined with available vegetation, and females will place some of their own down in the nest once they have laid a number of eggs. Males leave the breeding grounds shortly after eggs are laid. The young are born with down, and can feed themselves within a day or two of emerging from the egg. Mothers will watch over their brood for about four weeks, and help the young find food. Their primary food source in summer seems to be insects, although mollusks, crustaceans and some plant material are also consumed. Winters are spent at sea. In winter this species relies primarily on benthic food sources such as clams and other mollusks.

The population of Spectacled Eiders breeding in western Alaska has declined dramatically. From 1957 to 1992, the population declined 96 percent, prompting the USFWS to list the species as threatened throughout its range under the ESA in 1993. Less is known about the status of breeding populations in northern Alaska and along the Russian coast, although those populations are currently thought to be stable. Recent studies, which tracked birds by satellite, have shown that hundreds of thousands of Spectacled Eiders spend the non-breeding season in the Bering Sea south of St. Lawrence Island.

The primary threat to this species seems to be from lead poisoning. Over 100 years of hunting in the breeding areas of this species has introduced a large amount of lead shot pellets. Like many other bird species, eiders will swallow pebbles and pieces of shell to help with their digestive process. Once in the gizzard, this "grit" is used to crush food and make it available for

digestion. Lead pellets are attractive forms of grit to many species. One study of this species in western Alaska found that the annual survival rate of adult female Spectacled Eiders was reduced by 35 percent due to lead poisoning. Lead poisoning has also been documented in ducklings. A variety of other pollutants have been found in the blood, feathers and eggs of this species, including arsenic, barium, cadmium, mercury, selenium and a variety of other trace elements. The effects of these pollutants have not been documented. Development of coastal sites, including expansion of oil exploration and production facilities, could pose a threat to this species during the breeding season.

The USFWS has taken a variety of steps to try and halt the decline of this species. In 1991, when it was apparent that the birds breeding in western Alaska were in trouble, sport hunting and egg collecting was closed throughout the State. Subsequently, agreements were reached with native people to stop subsistence hunting of the species. The ban on using lead shot for hunting was enforced in 1998.
(http://audubon2.org/webapp/watchlist/viewSpecies.jsp?id=193, last viewed: 7/7/05)

6.1.9.5 Steller's Eider

The Steller's Eider is a small duck frequently seen close to shore, or in sheltered inlets. Mixing black, white, blue, orange and green, male Steller's Eiders in breeding plumage are easily identifiable. Males have a white head contrasting against a black tail, back and neck collar. The breast and sides are orange. At close range, green spots before the eye and on the back of the head may be visible. Both sexes of this species are distinguished by their small size, "flat" head, long tail and distinctively shaped bill. Females and males in non-breeding plumage are brown, with a light eye ring.

The Steller's Eider is a year-round inhabitant of the Arctic, and breeds along Arctic coasts of Alaska and Russia. The U.S. population is most plentiful on the Arctic Coastal Plain near Barrow. The bulk of the population winters in the Bering Sea. The U.S. population is found mostly south of the Alaskan Peninsula, and out along the Aleutian Island chain. Birds breeding in western arctic Russia winter in the Northeast Atlantic Ocean and Baltic Sea and make up approximately 25 percent of total world population. This species has been difficult to survey but several populations have shown declines of greater than 20 to 90 percent since the 1960's. However, the bulk of the population is currently thought to be stable.

Courtship begins early, and Steller's Eiders are usually paired before departure to breeding grounds. Females select nest sites, usually on open tundra near water. The female will hollow out a nest bowl, line it with grasses, lichens and other material found near the nest, and add down from her own breast after a number of eggs have been laid. During this time, the male may make flights intended to distract predators. Steller's Eiders feed on insect larvae, and small marine invertebrates like polychaete worms, small mollusks and gastropods during the breeding season. Unlike other eider species, Steller's Eiders are found primarily close to shore in winter. They feed in shallow water where they dive for small mollusks, gastropods and crustaceans found in and amongst seaweed patches. The Steller's Eider is known for the propensity to dive and surface in unison with other members of large flocks.

Threats to this species are not well understood. Subsistence hunting is not thought to be a major threat in the U.S., but may be an issue in the Russian population. Environmental pollutants, such as lead, may be a threat, but have not been well documented. Oil spills have killed birds wintering near Finland, and could continue to be a threat as oil exploration and production continues on both continents. In general, this species is most vulnerable at staging areas and wintering grounds, such as Izembek and Nelson Lagoons in Alaska, where a large portion of the global population may be found at the same time.

Due to the isolated nature of wintering and breeding grounds on both continents, research and management for this species are difficult. The USFWS is monitoring the status of this species, and is providing some protection by reviewing activities that could be detrimental to the species both on and off wildlife refuge lands. It has also designated critical habitat for the species. (http://audubon2.org/webapp/watchlist/viewSpecies.jsp?id=197; last viewed: 7/7/05)

6.1.9.6 Sea Turtles

Three species of marine turtle occasionally occur in Alaska, including the endangered Leatherback sea turtle, and the threatened Loggerhead and Green sea turtles. Marine turtles are large, tropical/subtropical, thoroughly aquatic reptiles whose forelimbs or flippers are specially modified for swimming and are considerably larger than their hind limbs. Movements on land are awkward. Except for occasional basking by both sexes and egg-laying by females, turtles rarely come ashore. Although their age is often exaggerated, they probably live to 50 to 100 years.

The green turtle has a smooth, hard, olive or dark brown shell. It reaches a length of five feet and a weight of 800 pounds, although most adult green turtles are three feet long and weigh about 200 pounds. The leatherback has a smooth leathery skin with prominent longitudinal ridges on its shell. It is dark gray, brown, or black with whitish spots on neck and limbs. Leatherbacks reach eight feet and 1,500 pounds, although most leatherbacks are five feet long and weigh about 800 pounds.

Marine turtles are found worldwide. They breed in the tropics/subtropics and lay their eggs at night in holes dug on sandy beaches by the female. A single female may deposit several clutches of eggs each year. The eggs are round, covered with a parchment-like skin, and about as big as golf balls. The number of eggs laid ranges from 80 to 500. Green turtles are primarily vegetarian as adults. Leatherbacks feed almost exclusively on jellyfish. Leatherbacks have a mammal-like ability to maintain a high body temperature (about 80° F), independent of the temperature of the surrounding water. This may account for its relatively common occurrence in cold northern waters where jellyfish are seasonally abundant. In contrast to the leatherbacks, the hard shell turtles (green, and loggerhead) are considered warm water species, which rarely stray into cold Alaskan waters.

Marine turtles migrate a considerable distance between their nesting and feeding grounds.

Leatherbacks have been recorded 3,000 miles from their nesting grounds. The mechanisms of sea turtle navigation have been intensely investigated, but the cues or sensory systems involved are still unknown. Both green turtles and leatherbacks probably reach Alaska by way of the warm Japan Current and North Pacific Current which reach Alaska's Alexander archipelago, arc northwestward across the Gulf of Alaska, and then flow southwestward along the Aleutian chain.

All marine turtles are protected by the United States Government. Severe penalties are imposed for molesting or killing free-swimming turtles or salvaging turtles or parts of turtles stranded or dead on Alaska's beaches.
(http://www.adfg.state.ak.us/pubs/notebook/amphibia/turtle.php, last viewed: 7/7/05)

Other threatened and endangered species have already been discussed in previous sections.

6.1.10 Forests

Forests cover over one-third of the total land area of Alaska, and border the communities in which about 90 percent of Alaska's residents make their homes. There are two distinct forest types: coastal and boreal. The coastal rainforest begins in southern and southeast Alaska, and extends through Prince William Sound, and down the Kenai Peninsula to Afognak and Kodiak Islands. The boreal forest covers much of interior and southcentral Alaska. Alaska's coastal forests comprise a total of 13.7 million acres of temperate coastal rainforest. These forests are composed predominantly of Western and Marine Hemlock (71.4 percent and 7.4 percent, respectively) and Sitka Spruce (12.8 percent) along with Western Red Cedar (3.8 percent), Poplar (2.9 percent), White Spruce (0.4 percent), and Paper Birch (0.1 percent). The abundance of Alaskan forest assets is constantly changing over time due to growth, mortality, and timber harvest. Coastal forests grow at the rate of about 10,064 cubic feet per acre per year, totaling 1,161,386 cubic feet per year. Wildfires, insects, and diseases kill many acres of forest each year. The spruce bark beetle is the primary insect threatening Alaska forests.

Based on 1995 estimates provided by the U.S. Forest Service Anchorage Forestry Sciences Laboratory, five million acres contain commercial timber without logging restrictions; 2.6 million acres are productive reserved forestland that includes parks, refuges, wilderness areas, and other land with restrictions on logging; and the remaining 6.1 million acres is comprised of forested areas in urban areas or areas with few or sparse trees. (Larson, 1998) The two largest national forest in the United States are in this region. With 16.8 million acres, the Tongass National Forest is the largest national forest in the United States. Although established in 1907, only 400,000 acres have been harvested to date; approximately four percent of the 9.5 million forested acres on the Tongass. The 1997 Tongass Land Management Plan schedules 176,000 acres for timber harvest over the next 100 years. The second largest national forest is the Chugach National Forest, at 5.9 million acres in south central Alaska, south and east of Anchorage, encompassing the Prince William Sound area and much of the Kenai Peninsula. Most of the Chugach is managed as fish and wildlife habitat, with only about six percent of the land base considered productive forest land. Spruce bark beetle infestations have killed much of the trees on the Chugach in recent years.

The timber regions are managed by four landholders: the Federal government (51 percent); State, university and local governments (25 percent); Native corporations (24 percent); and other private landowners (0.4 percent). (Alaska Forest Association, 2005)

Forests contribute to Alaska's economy directly through commercial and subsistence harvests of timber. However, they also add value to Alaska's economy indirectly through the contribution of forest ecosystems to socially valuable activities. In Alaska, the indirect ecosystem services of forests, generally not measured by dollar flows, are very important, and may exceed values obtained from commercial timber operations in many parts of the State. Such services include purification of air and water, mitigation of droughts and floods, generation and preservation of soils and renewal of their fertility, cycling and movement of nutrients, protection of coastal shores from erosion by waves, and partial stabilization of climate. Large areas have been permanently devoted to sustaining these uses in Alaska. About six million acres, or 40 percent of the productive forest ("timberland") in Alaska, is reserved for non-harvest uses. A larger proportion of the area of Alaska, including productive forests, has been placed into the strictest categories of protection than nearly any similar-sized region in the world.

Much of the harvested timber is stored onshore and then transported on waterways to various destinations for processing.

Logging effects on wetland habitat can result from clearcutting, construction of logging roads, and the building and use of transfer sites for transporting logs by waterways. The actual harvest of trees converts needle-leaved, evergreen, forested wetlands to deciduous shrub wetland types. Only about five percent of the land harvested for timber in Southeastern Alaska is wetland. The conversion from forested to shrub wetlands may not result in long-term loss of wetland values, only a conversion from one set of wetland functions to another. However, before trees and shrubs re-establish themselves, erosion can occur, clogging waterways frequented by salmon and other anadromous fish. Logging in upland areas can also result in sediment eroding into watercourses. Wetlands can also be lost to the construction of onshore storage areas, loading platforms, and docks. Transferring logs from land to water or boats requires a facility that extends from the shore out to the water. The USFWS estimates that the 90 sites active in 1985 had directly destroyed about 300 acres.

Secondary environmental impacts associated with log transfer sites include the accumulation of bark debris and concentration of organic compounds in estuaries. Bark strips away as logs are dumped into the water and rafted for temporary storage. The USFWS estimates that the bark has degraded about 176 acres of substrates, reducing the biota along with the food and cover used by other water-dependent species. This constitutes a small but ecologically significant portion of the estuarine area in Southeastern Alaska. Organic compounds leaching from the logs also serve to degrade water quality. High concentrations of organic compounds have been measured at the transfer sites and dissolved oxygen concentrations measured in coastal waters have been below Alaska's minimum standard. (http://www.doi.gov/oepc/wetlands2/v2ch13.html; last viewed: 7/7/2005)

Road construction for logging purposes can cause loss and degradation of freshwater wetlands. To date, 3,500 miles of roads have been built in the Tongass. Since 1980, construction has averaged about 100 miles of new roads per year and 34 miles of reconstruction. About 1,050 miles of roadways occur in wetland areas. The USFWS estimates that roads account for about 2,000 acres of direct wetland loss. In addition to the direct losses, roads often alter the hydrologic regime. Culvert placement, for example, usually alters waterflows on both the uphill and downhill sides of roads. Roads also isolate wetland areas, and activities during construction can cause erosion and the silting of streams.

6.1.11 Air Quality

Air quality in a given area is a function of the air pollutant emissions in an area (type of pollutant, rate, frequency, duration, exit conditions, and location of release), atmospheric conditions (climate and meteorology), characteristics of the area itself (size of air shed and topography of the area), and the presence of pollutants transported from outside the area. Air quality in the majority of Alaska's coastal area is generally considered very good because of minimal human habitation and industrial development. Localized sources of emissions include man-made (anthropogenic) sources of industrial, residential, and transportation-related emissions, and natural sources of windblown dust and forest fires, which contribute to temporary increases in air pollution.

The Alaska DEC has a longstanding program of monitoring air quality. Alaska is a huge state with a small population, and it is not possible for DEC to monitor the air in every community. Therefore, DEC has taken a three-pronged approach to monitoring network design: 1) monitoring larger communities to cover the largest possible population exposure; 2) monitoring designated smaller towns that are representative of multiple communities in a region; and 3) monitoring in response to complaints. The largest population centers in Alaska's coastal area are Anchorage and Juneau (260,000 and 30,000 people respectively). There are no other communities with populations over 10,000. There are several towns with populations between 1,000 and 10,000, and there are many towns smaller than 1,000 people (in many cases much smaller).

6.1.11.1 Criteria Pollutants

The Clean Air Act, which was last amended in 1990, requires EPA to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. The Clean Air Act established two types of national air quality standards. Primary standards set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings.

The EPA Office of Air Quality Planning and Standards has set NAAQS for six principal pollutants, which are called "criteria" pollutants. The six principal pollutants include lead, nitrogen dioxide, particulate matter (PM-10), particulate matter (PM-2.5), ozone, and sulfur

oxides. To protect human health and welfare, NAAQS (40 CFR 50) and Alaska Ambient Air Quality Standards (AAAQS) (18 AAC 50.010) establish maximum air pollutant levels for these six principal pollutants that are not to be exceeded. Air Quality Control Regions have been established to implement the air quality standards. In addition, Prevention of Significant Deterioration (PSD) regulations (18 AAC 50.020) limit the maximum allowable incremental increases in ambient concentrations above an established baseline. By limiting the allowable increases in pollutant concentrations, the PSD regulations were intended to protect air quality in areas attaining the ambient standards from deteriorating up to these standards. Smaller increments are established for Class I areas, such as national parks or wilderness areas, than for other areas.

PSD regulations apply to major new sources and modifications to existing sources. Currently the only principal pollutant for which Alaska has current nonattainment areas is PM-10. Particulate matter, also called particle pollution, is a mixture of solid particles and liquid droplets found in the air. Some particles, such as dust, dirt, soot, or smoke, are large or dark enough to be seen with the naked eye; others are so small, they can only be detected using an electron microscope. Particle pollution also varies by time of year and by location and is affected by several aspects of weather, such as temperature, humidity, and wind. In general, particle pollution consists of a mixture of larger materials, called "coarse particles," and smaller particles, called "fine particles." Coarse particles have diameters ranging from about 2.5 micrometers to more than 40 micrometers, while fine particles, also known as PM-2.5, include particles with diameters equal to or smaller than 2.5 micrometers. EPA also monitors and regulates PM-10, which refers to particles less than or equal to 10 micrometers in diameter. PM-10 includes coarse particles that are inhalable; particles ranging in size from 2.5 to 10 micrometers that can penetrate the upper regions of the body's respiratory defense mechanisms. There are two designated nonattainment areas for NAAQS in the coastal area: Eagle River and Juneau, Alaska. Both have been found to be non-attaining for moderate levels of PM-10.

Previously, until mid-2004, for the last 12 years both Anchorage and Fairbanks had been designated as non-attaining for carbon monoxide (CO). In 2004, they were both redesignated at attainment areas. (EPA's Green Book) CO is a colorless and odorless gas, formed when carbon in fuel is not burned completely. It is a component of motor vehicle exhaust, which contributes about 60 percent of all CO emissions nationwide. Nonroad vehicles account for the remaining CO emissions from transportation sources. High concentrations of CO generally occur in areas with heavy traffic congestion. In cities, as much as 95 percent of all CO emissions may come from automobile exhaust. Other sources of CO emissions include industrial processes, nontransportation fuel combustion, and natural sources such as wildfires. Peak CO concentrations typically occur during the colder months of the year when CO automotive emissions are greater and nighttime inversion conditions (where air pollutants are trapped near the ground beneath a layer of warm air) are more frequent.

6.1.11.2 Regional Haze

Regional haze refers to haze that impairs visibility in all directions over a large area. The distance that one can see is limited because of tiny particles in the air absorbing and scattering

sunlight, which in turn degrades color, contrast, and clarity of the view. Many sources produce the particulate matter that causes haze. Particulate matter is both manmade and naturally occurring. Some natural sources of particulate matter include windblown dust, wildfires, "bioorganic" emissions from trees, and coastal emissions from the ocean. Manmade sources include gas and diesel engines, electric utility and industrial construction, and agriculture. Additionally, particulate matter is formed when gaseous pollutants undergo chemical reactions with sunlight in the atmosphere. Factors such as weather and humidity further impact the formation of haze. Particulate matter tends to remain suspended in the air for a long period of time and can travel to areas hundreds or even thousands of miles away from the pollution sources.

On July 1, 1999, EPA announced a rule designed to protect and improve visibility in 156 national parks and wilderness areas throughout the country. The Regional Haze Rule establishes specific State Implementation Plan requirements and strategies to adopt when implementing a plan. States must develop long-term plans for reducing pollutant emissions that contribute to visibility degradation and within the plans establish goals aimed at improving visibility in Class I areas. Under the rule, Class I areas must be at "natural conditions" in 60 years. The State Implementation Plan must address haze caused by all sources of pollutants that impair visibility including haze caused from smoke, vehicles, electric utility and industrial fuel burning, and other activities that generate pollution.

Alaska has four Class I areas subject to the rule, including Denali National Park and Preserve, Tuxedni Wilderness Area, Simeonof Wilderness Area, and the Bering Sea Wilderness Area. Three of these, the Tuxedni Wilderness Area, the Simenof Wilderness Area, and the Bering Sea Wilderness Area, are in the State's coastal area. In general, the farthest distance one can see a landscape or feature measures visibility. Currently, haze reduced visibility in the western United State from 140 miles to between 33 and 90 miles. Alaska's visibility is far better than the lower 48 states. On a "hazy" day in Denali, the average visibility is 130 miles and on a mid-range day, visibility can range from 205-255 miles.

In Alaska, the planning process to implement the regional haze rule is currently underway. A Long Term Strategy Plan is due no later than 2008 and must be updated and revised every ten years. The Strategy Plan will demonstrate how the State will reach natural conditions by 2064 and show progress in emissions reductions. The rule also requires emissions limits be determined for certain older, large stationary sources, i.e., power plants, and refineries. Sources found contributing to Regional Haze will be required to install Best Available Retrofit Technology within five years after a State plan has been approved. In addition to large stationary sources, other sources that contribute to regional haze that may be identified in the Strategy Plan could include mobile sources, and "area" sources such as residential wood combustion and gas stations, burning related to forestry and agriculture activities, and dust from roadways and construction activities. Local air quality issues in Alaska include smoke from forest fires or woodsmoke from home uses, and dust from gravel roads.

6.1.11.3 Hazardous Air Pollutants

Toxic air pollutants, also known as hazardous air pollutants, are those pollutants that are known or suspected to cause cancer or other serious health effects, such as reproductive effects or birth defects, or adverse environmental effects. EPA is working with state, local, and tribal governments to reduce air toxics releases of 188 pollutants to the environment. Examples of toxic air pollutants include benzene, which is found in gasoline; perchlorethlyene, which is emitted from some dry cleaning facilities; and methylene chloride, which is used as a solvent and paint stripper

by a number of industries. Examples of other listed air toxics include dioxin, asbestos, toluene, and metals such as cadmium, mercury, chromium, and lead compounds.

People exposed to toxic air pollutants at sufficient concentrations and durations may have an increased chance of getting cancer or experiencing other serious health effects. These health effects can include damage to the immune system, as well as neurological, reproductive (e.g., reduced fertility), developmental, respiratory and other health problems. In addition to exposure from breathing air toxics, some toxic air pollutants such as mercury can deposit onto soils or surface waters, where they are taken up by plants and ingested by animals and are eventually magnified up through the food chain. Like humans, animals may experience health problems if exposed to sufficient quantities of air toxics over time.

Most air toxics originate from human-made sources, including mobile sources (e.g., cars, trucks, buses) and stationary sources (e.g., factories, refineries, power plants), as well as indoor sources (e.g., some building materials and cleaning solvents). Some air toxics are also released from natural sources such as volcanic eruptions and forest fires.

Neither the EPA nor the State of Alaska has established ambient hazardous air pollutant standards.

6.1.12 Hydrology

Alaska's water resources include more than three million lakes greater than five acres in size, 365,000 miles of rivers and streams, over 174,000,000 acres or freshwater wetlands, and 36,000 miles of coastal shoreline. (AK 2002/2003 WQ Report)

6.1.12.1 Groundwater

Alaska's groundwater resources may be among the most extensive in the nation. However, very few of Alaska's aquifers have been studied (or even located) and little water quality data is available. Groundwater is a source of drinking water for about 50 percent of Alaska's population, and 90 percent of the State's rural residents. Eighty-seven percent of Alaska's 3,500 public drinking water systems are groundwater supplied. A small number of public water systems (e.g., Anchorage and several southeastern communities) serve a large number of people from primarily surface water sources. Ninety percent of the private drinking water supplies are groundwater. Of the 275 million gallons of water used each day for domestic, commercial, industrial, and agricultural purposes in Alaska, roughly 23 percent is derived from

aquifers.

Groundwater is available in most areas of Alaska, except where permafrost is very deep in the northern part of the State. South-central and interior Alaska have the greatest dependence on groundwater. Arctic, western, and southeastern Alaska makes more frequent use of streams, rivers, lakes, and rainwater catchments. The largest groundwater withdrawals occur

in the Anchorage and Fairbanks areas, and to a lesser extent, the Matanuska-Susitna and Kenai Peninsula Boroughs in the south-central portion of the State.

Most of Alaska's aquifers consist of unconsolidated materials derived from glaciers, rivers, and streams. Ground water supply aquifers range from extremely small thaw bulbs in permafrost to large regional aquifers. The extensive permafrost development around the State provides challenges to the development of ground water resources. In many parts of Alaska, steep topography limits the size of most aquifers, preventing large scale extraction. (http://www.dnr.state.ak.us/mlw/water/hydro last viewed 7/8/2005) Producing aquifers are typically unconfined (i.e., not protected by a layer of clay or silt), and the depth of the water table ranges from a few feet to over 400 feet statewide.

Although water quality data is sparse, most of the State's groundwater is suitable for domestic, agriculture, aquaculture, commercial, and industrial uses with moderate or minimal treatment. Naturally occurring iron, manganese, and arsenic are the most common treatment problems in groundwater systems. Fuel storage and wastewater disposal, primarily from onsite (septic) systems, are common threats to groundwater quality statewide. Additionally, a range of other activities either have, or have the potential to, affect groundwater quality (e.g., nonpoint pollution in urban areas, natural resource extraction activities in remote locations, and a wide range of potential point sources of pollution). Approximately 2,165 leaking underground storage tanks have been identified across the State so far. Roughly 50 percent of those identified tanks may affect groundwater quality. Another 2,781 contaminated sites have been identified that may affect groundwater quality. These contaminated sites include seven Superfund sites and 13 Resource Conservation and Recovery Act-permitted sites where clean-ups are currently under way.

Protection of Alaska's groundwater is largely accomplished through the regulation of contaminated sites, storage tanks, spill response, and specific waste disposal activities under State and federal programs. DEC manages several programs that contribute to the protection of groundwater, including the Contaminated Sites, Storage Tank, Prevention & Emergency Response, Industry Preparedness & Pipeline, Solid Waste, Pesticides, Water & Wastewater, Drinking Water Protection, Water Quality Protection, and Community Assistance & Information programs. US EPA's Underground Injection Control Program, and a number of other important EPA programs, can also have a significant impact on groundwater quality in Alaska.

6.1.12.2 Surface Water

Alaska has the greatest surface water resources of any state in the United States; more

than three million lakes, over 12,000 rivers, thousands of streams and creeks, and an estimated 100,000 glaciers. The Yukon, Kuskokwim and Copper Rivers are among the ten largest rivers in the U.S. Approximately 40 percent of all the surface water outflow for the entire United States comes from Alaska. The State receives an average of approximately 1,050,000 million gallons per day in the form of precipitation. Surface water is used for about half of Alaska's domestic water supply, and supplies approximately 75 percent, or about 300 million gallons per day of the State's water needs for industry, agriculture, mining, fish processing, and public water use. Even with all of the surface water in Alaska, a number of communities experience water quantity problems because of inadequate supplies (especially in permafrost regions), lack of satisfactory distribution systems, and droughts.

Many of Alaska's lakes and streams are frozen, or partially frozen, for five to six months of the year. In late April and May, "breakup" occurs when the snow melts, and streams thaw. A typical Alaska stream experiences low flows from December through March, peak flows during breakup in May through June, lower summer flows in July and August, secondary peak flows produced by rainfall in September through October, and declining flows in November. Alaska's surface waters include over 15,000 anadromous streams which support seagoing fish, including salmon.

Glaciers are found in a variety of settings in Alaska and come in a variety of different types, including mountain, valley, piedmont, cirque, hanging, and tidewater glaciers. Found at the heads of fiords and inlets, tidewater glaciers flow to the seacoast. Glacier Bay alone has sixteen tidewater glaciers flowing into it. In Southeast Alaska, many of the most active glaciers calve daily when giant pieces of ice crack off the head of the glacier and fall into the sea. Tidewater glaciers that end in deep water can also calve from under the water, shooting huge pieces of ice-like missiles up through the surface to fall back with mighty splashes. The image of slow, imperceptible glacial movement is now replaced by the sounds of the thundering ice bergs cracking and falling into the sea. The freshly-calved bergs are often a sparkling deep blue and assume fantastic shapes as they slowly drift with the currents or beach themselves on outgoing tides. All this makes tidewater glacier watching a popular tourist attraction by sea or air.

As a tidewater glacier advances, it pushes a mound of debris called a moraine shoal in front of its terminus, protecting it from deep tidal water. If climate or glacial dynamics force the glacier's terminus to retreat from its moraine shoal, the deeper water behind the shoal causes the glacier to calve, rapidly producing many icebergs and triggering its retreat. Once the glacier retreats to a stable position, calving slows, and the glacier advances again, gradually rebuilding its moraine shoal. Alaska has an estimated 100,000 glaciers, ranging from tiny cirque glaciers to huge valley glaciers. There are more active glaciers and ice fields in Alaska than in the rest of the inhabited world. The largest glacier is the Malaspina at 850 square miles. Five percent of the State, or 29,000 square miles, is covered by glaciers. (http://www.dced.state.ak.us; last viewed: 7/19/2005) Glaciers significantly influence most of Alaska's major rivers, even though glaciers cover only five percent of the State. For example, glaciers cover only five percent of the Tanana River drainage basin, yet glacial meltwater accounts for half of the river's runoff. (http://www.dnr.state.ak.us/mlw/water/hdro last viewed: 7/8/2005)

6.1.12.3 Wetlands

According to EPA and the Society of Wetland Scientists, Alaska's has almost 175 million acres of wetlands, occupying 43.3 percent of its 403,247,700 acres. By comparison, the entire remainder of the U.S. contains 103,000,000 acres of wetlands, comprising approximately 5.2 percent of the 1.9 billion acre land surface. (http://www.epa.gov/owow/wetlands/facts/fact9.html, last viewed: 9/12/04) Wetlands in Alaska include: salt and fresh marshes, mud flats, forests, ponds, wet and moist tundra, fens, and bogs. Most regions in Alaska have a land surface with extensive areas of wetlands. Expanses of moist and wet tundra underlain by permafrost occur in the northern and western regions. Interior Alaska contains vast areas of black spruce lowlands and extensive floodplains dominated by deciduous shrubs and grasses. Forests, scrub shrub, and peatlands are a conspicuous feature of south-central and southeast. Even in the mountainous areas such as the Brooks Range, wetlands have developed in drainages and on vegetated slopes. Some of the Nation's most extensive complexes of salt marshes and mud flats occur along the coasts of the Beaufort Sea, Chukchi Sea, Bering Sea and the Gulf of Alaska. (http://www.sws.org/regional/alaska/Wetlands.htm, last viewed: 7/7/2005).

Wetlands are abundant in the valleys and basins associated with Alaska river systems, including the Yukon, Kuskokwim, Porcupine, Tanana, and Koyukuk Rivers. The major river deltas also possess large wetland areas. One of the largest coastal deltas, the Yukon-Kuskokwim Delta, supports several wetland types. Other predominant wetland deltas of Alaska include the Colville River Delta on the Beaufort Sea Coast, the Copper River Delta in Southcentral Alaska, and the Stikine River Delta in Southeast Alaska. The quality and connectivity of Alaska's wetland habitat is generally healthy.

Salt Marsh

Salt marshes are intertidal wetlands vegetated with sedges, goose tongue and other salt-tolerant plants. The salt marsh ecosystem is defined between the mean high watermark and the lower intertidal zone. Alaska has 345,000 acres of salt marsh wetlands along 33,000 miles of coastline. Yet salt marsh habitat in Alaska represents only two tenths of one percent of the State's total wetlands, and only four percent of the total vegetated tidal marshes in the United States.

Salt marshes are typically located at river mouths and behind barrier islands, coves, spits and on tide flats where low energy wave action and fine sediment deposits provide elevated land for marsh vegetation to establish. They are located at mid to upper intertidal elevations and characterized by salt tolerant plant communities such as certain types of sedges and grasses. Species composition and the distribution patterns of salt marsh vegetation communities can vary distinctly based on differences in elevation, drainage, and soil type. In Alaska salt marshes, Creeping Alkali Grass is the dominant plant. Some of the Nation's most extensive complexes of salt marsh habitat occur along Alaska's coastline of the Beaufort Sea, Chukchi Sea and the Gulf of Alaska.

Sedge Wetland

Sedge wetland habitats are dominated by 50 percent or greater sedge species such as *Carex* spp. typically inundated with water. Trees, shrubs and lichens are absent, but aquatic mosses may be present. Sedges compose the largest genus of plants in Alaska and consist of erect, rooted, water-loving vegetation. The U.S. Department of Agriculture-Natural Resources Conservation Service (2003) National Plants Database identifies 155 species, subspecies and varieties of sedges in Alaska, of which 113 can be found in wetlands. Sedge habitats are found in relatively slow-flowing open water along streams and lakes and ponds, and in sloughs, coves and side channels of rivers, generally in organic-rich mulch substrate. Sedge wetlands also make up a significant area of wetland habitat above tidal influence in Alaska.

Sedge wetlands in Alaska are dominated by a variety of species, depending on the locality of occurrence. Fresh sedge wetlands are commonly found in south-central and southeast Alaska, and also in the interior portion of the State. Species in these areas include *Scirpus validus, Eleocharis-palustris-Hippuris vulgaris*, and *Eleocharis palustris-Myriophyllum spicatum*. Sedge wetlands occur in very wet areas of floodplains, margins of ponds, lakes and sloughs and in depressions of upland areas throughout interior, south-central, and southeast Alaska and the Aleutian Islands. Common plants occurring in these areas include a large list mainly from the species *Carex*, in addition to *Deschampsia beringensis-Carex lynbyaei*, and *Erioporum angustifolium-Carex livida*. In the southern areas of the State, sedge mats in filled lakes, ponds and depressions are common and may consist of species such as *Eriophorum russeleolum-E. Scheuchzeri, Eriophourm spp.-Menyanthes trifoliate, Eriophorum russeolum-Carex kelloggii-Calamagrostis canadensis*, etc.

Grass Wetland

Grass wetlands are dominated by 50 percent or greater water tolerant grass species. The grasses may occur in clumps or tussocks subjected to fluctuating water regimes. Woody plants and lichens are absent. Aquatic mosses may occur seasonally. The soil substrate associated with grass wetlands is generally organic or mineral rich. In addition to providing important wildlife habitat, they function as important groundwater recharge areas that maintain minimum base flows important to aquatic resources by storing storm and floodwaters.

Wet meadow habitats commonly occur in poorly drained areas such as shallow lake basins, and the land between shallow marshes and upland areas. In Alaska, forested wetland areas that have been cleared for agricultural purposes, such as in the Point MacKenzie and Matanuska-Susitna areas of the Cook Inlet basin, and areas of Delta Junction and Kenny Lake have been converted to wet meadow habitat. Some wet meadows are also found at higher elevations of the alpine country. For most of the year wet meadows are without standing water, though the high water table allows the soil to remain saturated. Wet meadows are relatively young wetlands dominated by soft-stemmed herbaceous plants. They are hydrated by rainfall, snowmelt, groundwater, and year-round and ephemeral streams. Plant communities found in Alaska's wet meadow habitats include wet herbaceous and wet forb graminoids and aquatic herbaceous species.

Bog

Bog habitats represent many thousands of years of wetland succession. In contrast to early successional freshwater wetland with only a shallow depth of organic material overlying mineral substrate, a bog consists of several feet of peat deposits. Bogs are characterized by spongy peat deposits, acidic waters, and an overlying vegetative layer of thick sphagnum moss. Peat is the result of undisturbed decomposed remains of mosses and sedges that gradually become deep peat deposits. Additional bog habitat classifications include shrub-bog and forested-bog types, depending on successional stage of the landscape. Most of Alaska's wetlands are peat lands, covering approximately 110 million acres.

Bogs receive most of their water from rainfall rather than from runoff, streams or groundwater infiltration. As a result of this, and combined with acidic conditions, bogs are low in nutrients necessary for plant growth. Flora and fauna that live in bogs are uniquely adapted to these specific habitats and demonstrate many special adaptations to cope with the low nutrient levels, waterlogged conditions, and acidic waters. Evergreens and shrubs are the most abundant woody plants found in bog habitats. Blue grouse forage in bogs for berries and insects. Species such as the gray owl depend on bogs for survival.

Because bogs require a persistently wet and cool climate in order to allow the growth of peat forming sphagnum mosses, they are predominantly found in the northern hemisphere. Bogs have recently been recognized for their role in regulating the global climate by storing large amounts of carbon in peat deposits. Bog habitats are particularly susceptible to destruction as they take hundreds of thousands of years to develop, yet they can be destroyed in a matter of days.

6.1.12.3.1 Wetland Biological Importance

Alaska's coastal wetlands are biologically among the most productive areas in the world. These coastal and riverine wetlands are critical to the life cycles of many marine and anadromous species that mature and are harvested offshore, such as salmon, herring, pollack, and sole.

Fisheries

The relationships between wetlands and fish production are essential and important. Because of the complexity of aquatic systems, it is difficult to quantify the exact effect of the loss or degradation of a particular acre of wetland on a fishery as a whole. However, the life cycles of most commercial fish and shellfish species are fairly well understood, and biologists have determined that wetlands play an important part in providing food, protection, and spawning areas for many species. Approximately 75 percent of the nation's commercial fish and

shellfish depend on estuaries at some stage in their life cycle. Estuaries themselves depend on wetlands to maintain water quality and provide the basis for food chains that culminate in human consumption of seafood. Many estuarine-dependent species have even closer ties to wetlands in that they feed,

take refuge, or reproduce in the wetlands themselves. Without wetlands, these fish and shellfish cannot survive.

Of the commercial fish and shellfish harvested in Alaska, about 76 percent are dependent on estuaries and the wetlands that are an integral part of the estuarine ecosystem. The Alaska region is one of the most productive areas of the world's oceans, supporting large populations of salmon, groundfish, crabs, marine mammals, and seabirds. Alaska leads all other states in pounds of fish landed and their dockside value. Fishing occupies a traditional place in the State's economy, and is considered part of Alaska's heritage. Towns such as Dutch Harbor-Unalaska, Kodiak, Petersburg, Akutan, and Cordova depend to a large extent or almost exclusively on fishing to support their economies. Fishing is the largest nongovernment employer in the State, and the export of fish products from Alaska plays a major role in reducing the nation's trade deficit. Approximately one-third of the recreational fishery occurs in coastal waters.

Pacific salmon alone is an integral part of the culture heritage and economy of Alaska. It is estimated that the salmon industry in Alaska employs 22,000 people. The 1995 statewide salmon catch had a dockside value of $496 million. Because salmon move between fresh water and saltwater, they are dependent on both coastal and riverine wetlands for the successful completion of their life cycle. Logging, mining, and industrial urban development can often degrade salmon habitat.
(http://www.nmfs.NOAA.gov/habitat/habitatconservation/publications/habitatconections/habitat connections.htm; last viewed: 7/8/2005)

Biological Diversity

Wetlands are also one of the most productive habitats and are important in preserving the State's biological diversity. Alaska's wetland habitats are the summer breeding grounds for the hundreds of thousands of migratory birds that utilize all four North American flyways to fly south to their wintering rounds. The expansive and varied wetland habitats of the Copper River Delta are of international importance as staging areas for millions of migrating shorebirds. Large wetland areas such as the Copper River Delta are extremely valuable because they provide large, whole and intact complexes. Waterfowl and waterbirds are wetland-dependant, and many species of songbirds nest and/or feed in wetland habitats. In addition, raptors and owls often frequent wetlands to forage. Brown bears forage for returning salmon in these same locations. Amphibians breed in wetlands, and many spend their entire lives in wetlands. Damselflies and dragonflies also utilize wetlands as their breeding and feeding grounds, as well as for cover. They prey on insects, such as aphids and mosquitoes. Voles live and eat the meadow grasses and seeds. They build distinctive runways crisscrossing through the area. They also dig underground tunnels where they construct food and nesting chambers. During the winter in

snow-covered areas, the voles make runways beneath the snow and feed on the snow-flattened grasses. Voles are the staple foods of weasels, marten, foxes, coyotes, all owls, most hawks, inland breeding gulls, jaegers, and occasionally great blue herons, domestic cats, northern pike, and other voles. Wetland grasses and sedges provide habitat structure for production of invertebrates, crustaceans and insect larvae that many species of animals are dependent upon.

Species ecological interaction plays an important role in the healthy function of wetland habitat. For example, wetland animal species facilitate decomposition of organic matter and enhance nutrient regeneration, serve as food for a variety of higher trophic levels; and exhibit high sensitivity to human impact. This makes them excellent indicators of wetland pollution.(http://www.sf.adfg.state.ak.us/statewide/ngplan/files/appendixpercent204d.pdf, Last viewed, 7/8/2005)

Although wetlands comprise 43.3 percent of the State, the distribution of wetlands in Alaska varies considerably within the State's physiographic regions. Many of the wetland types discussed above are limited in extent, and only certain wetland types are of value to living marine resources. For example, while there are approximately 44,500 miles of shoreline in Alaska, coastal salt marshes comprise only 360,000 acres, and seasonally flooded forested wetland on stream and river flood plains comprise only 204,000 acres.

6.1.12.3.2 Wetland Losses

About half of all Colonial-era wetland acreage in the lower 48 states has been converted to agriculture, development, or other land uses. In urbanized and developed areas of Alaska, such as Anchorage, over 50 percent of the wetlands have been developed. Although there is no statistically reliable data on statewide wetland losses, the USFWS estimates that Alaska has lost 200,000 acres, or less than one percent of the State's original wetland acreage. Additionally, significant percentages of wetlands in other urbanized areas in Alaska including Juneau, Fairbanks, the Matansuka-Susitna Valley, and the North Slope have been lost or impacted (Alaska's Final 2002/2003 Integrated Water Quality Monitoring and Assessment Report). Wetland losses in coastal Alaska result from development in five major sectors: (1) transportation systems, including roads, bridges, pipelines, airports and harbors; (2) urban development near major population centers; (3) forestry in southeastern Alaska; (4) oil and gas development on the north slope; and (4) placer mining. In southeastern Alaska, urban development and logging have been the principal causes of wetland loss and degradation.

6.1.12.4 Water Quality

The vast majority of Alaska's watersheds, while not being monitored, are presumed to be in relatively pristine condition due to Alaska's size, sparse population, and general remoteness. Most of Alaska's waters are suitable for the following beneficial uses: water supply (drinking, agriculture, aquaculture, industrial); water recreation; and growth and reproduction of fish, shellfish, aquatic life, and wildlife. In some areas, some beneficial uses are limited by natural water quality conditions in Alaska, such as suspended sediment in glacial waterbodies, highly mineralized waterbodies, microorganisms such as giardia (beaver fever) and schistosoma

(swimmer's itch), and high bacterial counts from decomposing salmon in streams.

However, Alaska has localized water pollution. Surface water quality has been found to be impaired or threatened from sources such as urban runoff from development, septic systems and landfill leachate (Fairbanks, Anchorage, and Juneau), natural resource development, including mining operations in the interior and northwest Alaska, oil and gas development, seafood processing facilities in the Aleutian Islands, and forest products facilities in southeast Alaska (http://www.surfrider.org/stateofthebeach/05-sr/state.asp), and military development including both operational and abandoned installations. Fecal coliform bacteria, sediment, and petroleum products are the primary pollutants of surface waters in Alaska, while petroleum products are the primary pollutants of ground waters. Urban runoff is the most common pollutant source in Alaska overall. (http://www.dnr.state/ak.us/mlw/water/hydro/, last viewed: 7/8/2005)

6.1.13 Fossil Fuels

6.1.13.1 Oil and Gas

Alaska has two major commercially active oil and gas regions, located in Cook Inlet and on Alaska's North Slope. The first commercial production from an Alaska oil field began at Swanson River, Cook Inlet in 1959. Five other Cook Inlet fields began production between 1965 and 1972. Most recently, West McArthur River began production in 1993 and Redoubt in 2002. All Cook Inlet oil is currently shipped to the Tesoro refinery at Nikiski on the Kenai Peninsula. Oil from fields on the west side of Cook Inlet is transported by pipeline to the Drift River terminal, and then transported to Nikiski. Oil from the eastside fields is shipped by pipeline directly to the refinery. By year-end 2003, the Cook Inlet has produced almost 1.3 barrels of oil, including 10 million barrels of natural gas liquids.

Cook Inlet gas production began in 1959 as a by-product of Swanson River oil development. As more oil and gas fields were discovered, nearby markets for gas were developed in Anchorage and Kenai to supply space heat and electricity generation. In 1968 Unocal started up the ammonia-urea plant at Nikiski to take advantage of the abundance of cheap stranded natural gas. This plant was acquired in 2000 by Agrium, Inc. of Calgary, Alberta. In 1969, Phillips and Marathon began operating the liquid natural gas plant, also located at Nikiski. In recent years, liquefied natural gas (LNG) exports to Japan accounted for about one-third of total Cook Inlet gas production. Industrial use of Cook Inlet gas has remained fairly constant since 1983; production has increased in step with the growing residential and commercial demand for space heating and electric power generation. Cook Inlet natural gas production has remained relatively stable at an average of 213 billion cubic feet (Bcf) per year from 1997 to 2001.

Oil production on the North Slope began in 1969 at Prudhoe Bay. The Prudhoe Bay Unit on the North Slope of Alaska is the largest operating oil field in the United States having produced 12.8 billion barrels of oil since production began and with an estimated 6.4 billion barrels still in the ground. Production was initially restricted to small quantities used to fuel field

operations until the Trans Alaska Pipeline Systems (TAPS) was completed in July 1977. The North Slope has produced 14.4 billion barrels of oil and NGLs by the end of 2003; nearly all from the large Prudhoe Bay and Kuparuk fields. NGLs produced on the North Slope are blended with oil and shipped down TAPS or used to make miscible injectant for enhanced oil recovery projects. NGLs have been shipped from Prudhoe Bay to the Kuparuk River Unit via the Oliktok pipeline for miscible injectant in the Large-Scale Enhance Oil Recovery project at Kuparuk. Today, incremental oil production from new fields brought on line since 1995 account for approximately 27 percent of total yearly Alaska North Slope production. While production from the largest of North Slope fields, Prudhoe and Kuparuk is in decline, smaller and more numerous satellite oil and gas reservoirs are being developed and produced. North Slope oil production is expected to level out at about 1 million barrels per day through 2010. There are also enormous amounts of natural gas in the North Slope reserves. Construction of a natural gas pipeline from the North Slope is under active consideration.
(www.commerce.state.ak.us/dca/AEIS/PDF_Files/AEPR2002_OilandGas.pdf)

North Slope gas production began near Barrow in the mid-1940s. This gas was used initially to fuel a nearby military base. Gas service was extended to the village after World War II. The East Barrow and Walakpa fields were developed in 1980 to provide gas to Barrow. Gross gas production on the North Slope in 2000 was 3.2 trillion cubic feet (tcf) (8.7 billion cubic feet per day) but 93 percent of this volume was injected into oil producing reservoirs. The remaining net gas production, equal to 297 Bcf in 2003, is consumed locally on the North Slope to fuel oil field equipment operations, and pipelines. North Slope industrial yearly gas consumption is approximately equal to annual gas produced in Cook Inlet.

Drilling activity shows slight increases in recent years and the total number of feet drilled per year has been relatively steady since the mid eighties. New companies have entered the Alaska crude oil and gas upstream sector, and interest continues to grow, especially among independent exploration and production companies and in areas beyond the mature oil provinces of Cook Inlet and the North Slope, such as the North Slope Foothills, other interior Alaska basins and the Alaska Peninsula region. However, total oil production has steadily declined since it peaked at two million barrels per day in 1988, along with gross oil and NGL production from State lands. The majority of Alaska oil production comes from the North Slope, with a current production rate of slightly under one million barrels per day. That rate is expected to hold steady for at least the next seven years.

Three State agencies are responsible for evaluating oil and gas reserves and production: the AOGCC, the Department of Revenue, Tax Division DOR, and DNR, Division of Oil and Gas (DOG). Each agency calculates reserves using slightly different methods. AOGCC emphasizes geologic and engineering factors to estimate the total recoverable resource. DOR calculations emphasize oil and gas production economics and the impact of oil prices forecasted far into the future. DO&G reserves are calculated from the forecast of production from existing and planned developments that may reasonably be expected to occur in the near future. These agencies cooperate and coordinate the preparation of reserves estimates and production forecasts.

DNR holds four regularly scheduled oil and gas lease sales per year. DOG and the

Division of Geological and Geophysical Survey (DGGS) are working on obtaining geologic and geophysical data as well as conducting its own field work in new areas. DGGS and DOG geologists completed field work that will help companies in evaluating hydrocarbon potential for the proposed Alaska Peninsula Oil and Gas Lease Sale tentatively scheduled for fall 2005. In addition to competitive areawide leasing, DNR has instituted an exploration licensing program to encourage exploration in oil and gas basins outside of Cook Inlet and the North Slope. Four exploration licenses have already been issued – in the Nenana and Copper River basins, and two licenses in the Susitna basin. Recently, DOG received exploration license proposals for the northern portion of the Bristol Bay basin and Healy area. A short-lived shallow natural gas leasing program allowed DOG to issue non-competitive leases to explore for and develop natural gas reservoirs, including coalbed methane, located within 3,000 feet of the surface. (www.dog.dnr.state.ak.us/oil/products/publications/annual/2004_annual_report/Section1.pdf)

Industry Issues and Outlook

In early 2005, the U.S. Geological Survey (USGS) completed an assessment of undiscovered oil and gas resources of the central part of the Alaska North Slope and the adjacent State offshore area which indicated that there is a significant amount of oil and a large amount of gas that remains to be discovered. An estimated 4.0 billion barrels of oil (BBO), 37.5 tcf of natural gas, and 478 million barrels of natural gas liquids are undiscovered and technically recoverable (using current technology). The central North Slope already contains virtually all of the petroleum-producing infrastructure and pipelines in northern Alaska, including the TAPS. (USGS Press Release, 5/11/05)

It is very likely that the next oil patch to be developed will be the NPRA. In 2002 USGS scientists completed a four-year reassessment of the undiscovered oil and gas resources, including an economic analysis, which showed that the area contains between 1.3 and 5.6 economically recoverable BBO at market prices of between $22 and $30 per barrel. Estimates of technically recoverable oil on federal lands are between 5.9 and 13.2 BBO, with a mean value of 9.3 BBO. A large proportion of the undiscovered oil resources are estimated to occur in the northern third of the NPRA in moderate size accumulations. Its proximity to Prudhoe Bay infrastructure improves its potential. New estimates of technically recoverable undiscovered natural gas resources on federal lands in the NPRA range between 39.1 and 83.2 tcf, with a mean value of 59.7 tcf. The economic viability of the natural gas resources depends on the availability of a pipeline to transport the product to market in the lower 48 states. Presently, no natural gas pipeline exists. The bulk of the natural gas resources are thought to occur in the central and southern NPRA. (USGS Press Release: 5/16/02) Over $64 million in NPRA oil and gas leases were sold in June of 2002. A North Slope access road will be extended from Deadhorse to the village of Nuiqsut. This road will cross the Colville River and will cost an estimated $150 million, including the Colville bridge at $120 million. The road will permit test drilling to double over current rates.

There is considerable interest in the construction of a natural gas pipeline to bring Prudhoe Bay gas to market. Routing alternatives are along the Alaska Highway to Alberta, Canada or along the existing oil pipeline to Valdez. The gas line, estimated to cost up to $20 billion depending on routing, enjoys strong political support, but both prices and markets must

be secure to prompt investment. There are 35 tcf of known reserves of stranded natural gas on the North Slope, with total estimated reserves of 100 tcf. Construction of a natural gas pipeline is a top priority of the State Administration. The interest in a natural gas pipeline also brings the hope of an associated LNG pipeline and export facility in Alaska.

The State's second active oil and gas producing region is in Cook Inlet, within the boundaries of the Kenai Peninsula Borough. Several smaller independent operators have succeeded to leases formerly held by major oil and gas companies. Using new exploratory and drilling techniques, these operators have re-invigorated interest in the region. With improved techniques and the possibility of new discoveries, Cook Inlet could be producing gas for local markets and for export for many more years. The presence of independent oil companies using new exploration techniques and drilling technologies offers hope that Cook Inlet can remain a producing oil and gas region at levels above current production forecasts.

Gas exploration companies are interested in exploring for coalbed methane gas at three locations around the State: near Chignik on the Alaska Peninsula; near Fort Yukon at the confluence of the Porcupine and Yukon Rivers; and near Wainwright on the Arctic coast. The exploration program will provide valuable information on development costs and feasibility.

Exploration is also taking place in the Nenana Basin in interior Alaska, in the Copper River Basin near Glennallen and on the Alaska Peninsula/Bristol Bay. Exploration is also planned at the Katalla oil field near Cordova, where oil was produced from early in the 20th century through the 1920s. Gas or oil discoveries in interior basins, if economic, could provide for local energy needs; however, much exploratory work will be needed to determine whether commercial quantities of gas can be developed. Oil exploration and development in the Arctic National Wildlife Refuge (ANWR) failed to be included in the 2005 Energy Bill. ANWR is estimated to contain 4.3 to 11.8 BBO, with a mean value of 7.7 BBO.

The DOI has approved the federal MMS's 2002–2007 OCS leasing program. Eight lease sales are planned: Beaufort Sea in 2003, 2005 and 2007; Chukchi Sea/Hope Basin in 2004 and 2007; Cook Inlet/Shelikof Straits in 2004 and 2006; and Norton Sound in 2003. Resource estimates indicate the potential for significant amounts of oil and gas, however, further exploration is needed to determine actual reserves, and offshore development is expected to be both costly and lengthy. The MMS is attempting to see whether the gas-prone Hope Basin can be developed for local use, for both nearby communities and the Red Dog mine.

6.1.13.2 Coal

Alaska's coal resources make up about half of the United States coal-resource base and about one-sixth of the total world-resource base. (Schaff, 1983) Very little of this extensive resource has been developed because of competition from the petroleum and natural gas produced in the State. Alaska's total coal resources are estimated at between 5.5 and 6.0 trillion tons, over half of which are of bituminous rank. The total energy equivalent (in Btu) of all the coal in Alaska exceeds by several orders of magnitude that of all known oil reserves in the State. The energy equivalent of Alaska's bituminous coal resources alone is estimated to be more than

1,000 Prudhoe Bays (original recoverable reserves of about 10 billion barrels).

The northern Alaska coal fields form the largest coal resource province in the nation. It is divided into a southern bituminous subprovince and a large, predominantly subbituminous northern subprovince. The Meade River and Corwin Bluff Mines are in these fields, as are two other coal-bearing exposures of this region; Kukpowruk River and Elusive Creek. These coal deposits are located in the Naval Petroleum Reserve Alaska and occur in the Cretaceous Nanushuk Group on the Arctic Coastal Plan and foothills of the western North Slope. The Nanushuk Group is in the southwestern part of the province, near Cape Lisburne. The Cook Inlet-Susitna lowland is the second largest coal-resource province. It is composed of the Beluga Yentna, Little Susitna, Matanuka, Broad Pass, and Kenai coal fields plus offshore deposits in Cook Inlet. The Nenana coal trend forms the third largest coal-resource base in Alaska, however, it is not in the coastal area. (Schaff, AK DNR, 9/30/83)

The production of coal has fluctuated in Alaska from the time it was first mined on a commercial scale in 1855. Primarily it was purchased for in-state use. The military build up for World War II near Anchorage and Fairbanks expanded the market for coal, however the mines closed when the Alaska Railroad converted to diesel-electric locomotives and when oil and natural gas produced from large deposits discovered in Cook Inlet captured most of the coal market in the Anchorage area. Production continued to fluctuate between 600,000 to 900,000 short tons until 1985, when it rose sharply to 1.4 million short tons with the beginning of exports to Korea.

Since the early 1970's, the only active coal mine in Alaska has been operated by Usibelli, near Healy in the Nenana field, south of Fairbanks. While there continues to be some domestic customers for this coal, the majority is exported to the Korean Electric Power Company. Coal intended for the Korean market is transported from the mine by the Alaska Railroad about 300 miles to Seward, a year-round ice-free port. Pending an expansion of Alaska coal exports to the Asian market, several other coal mines in Alaska may be planned. Currently, only one surface mine actively produces coal in the State, and about half of its annual output of 1.5 million short tons is exported. The value of coal production to the economy of Alaska is also small. In 1992, coal was estimated to account for less than one percent of the total value of all mineral commodities produced in the State, including crude oil and natural gas. (http://www.eia.doe.gov/cneaf/coal/st_coal_pdf/0576e.pdf, last viewed: 7/19/2005)

Known sources of high-rank (bituminous) coal in Alaska's coastal area that could be exploited are located on Alaska's North Slope, in the Matanuska, Bering River, Chignik, and Herendeen Bay coalfields. The potential for coal development in Alaska is unlimited, and Alaska's strategic position on the northern Pacific Rim places it in the center of expanding trade routes. Alaska is closer to Far East markets than Australia, Canada, or South Africa. (DNR, 1993)

6.1.13.3 Environmental Issues

More than 750 exploratory oil and gas wells have been drilled in Alaska. The only commercially recoverable finds currently operating are on the North Slope and the Cook Inlet-Kenai Peninsula areas. Both of these areas have substantial wetland acreage associated with the oil and gas activity. Oil and gas exploration and development in wetland areas have significant impacts, particularly in Arctic regions where vegetative recovery is slow. The effects of oil and gas activities on wetlands differ between the exploration phase and the development phase.

The exploration phase of oil and gas operations usually results in little surface disturbance. Initial stages of geophysical reconnaissance are supported by helicopter personnel and only require small, temporary camps. Subsequent seismic surveying causes greater disturbance from overland transportation of equipment and personnel. Tundra wetlands can be affected by seismic survey or transportation corridors, particularly if activities occur when the tundra is not completely frozen.

Exploratory drilling, the final stage of exploration, can involve considerable surface disturbance, including: construction of drilling sites, camp sites, and airstrips; overland transport of equipment and personnel to drilling sites; and gravel mining. Transporting heavy equipment to drilling sites can cause removal or compaction of tundra, which in turn can cause thawing of permafrost and subsidence of the terrain. The combination of thermal erosion (thermokarst) and hydraulic erosion over longer periods of time can create further slumping or gullies and ravines. Using ice to construct exploratory drill pads and roads, although less damaging than using gravel, can require up to 15 million gallons of water and can drain tundra ponds and streams.

Petroleum development on the Arctic coastal plain results in much more extensive disturbance of wetlands, because it requires fill material (usually gravel) to construct an infrastructure. This infrastructure, which consists of drill pads, storage areas, transportation facilities, gravel mines, and other developments, alters terrain, disrupts natural drainage patterns, and changes or eliminates fish and wildlife habitat. The existing infrastructure for oil and gas operations in the Prudhoe Bay-Kuparuk complex is spread over more than 800 square miles of tundra. Nevertheless, the amount of wetland acreage affected is relatively small.

On federal lands, BLM attaches mitigation requirements to leases and conditions drilling permits with environmental safeguards. These requirements take into account regional and site-specific environmental factors worthy of protection. Wetlands are prominent among the resources receiving protection. Although all damage to wetlands from petroleum development on federal lands cannot be avoided, BLM actively attempts to protect these resources.

In addition to the direct impacts associated with placing gravel on tundra, petroleum development on the Arctic coastal plain has resulted in significant indirect impacts. In the wettest parts of the Prudhoe Bay oil field, flooding and thermokarst covered more than twice the area directly affected by roads and other construction activities. As with other types of developmental activities, stream crossings (e.g., for pipelines or access roads) can affect water quality through changes to stable stream banks, erosion, siltation, and stream bottom disturbance.

Other secondary effects such as release of contaminants, sewage dumping, oil spills, and dust have damaged or degraded wide areas of tundra wetlands adjacent to oil and gas facilities. Contaminants released from reserve pits by overflows, leaching, or breaching has released diesel fuel, heavy metals, ethylene glycol, and soluble salts onto the tundra, and has killed vegetation surrounding reserve pits. According to figures from DEC, in 1985 alone there were 521 oil spills on the Arctic coastal plain, amounting to about 82,000 gallons of oil. Diesel and crude oil, which can cause severe damage to tundra vegetation and can remain toxic for more than four years after the spill, accounted for almost half of the spills.

6.1.14 Minerals

In all, 191.1 million acres of mineral-rich land in Alaska is available for exploration and development. This is an area about twice the size of Nevada. Alaska contains more land open to mineral development than the other 49 states combined. Some of the major minerals mined in Alaska include zinc, gold, silver, lead, copper, and coal. Currently, there are three large mining projects in Alaska's coastal area: Kensington Gold Project, Greens Creek Mine, and the Red Dog Mine.

6.1.14.1 Kensington Gold Project

The Kensington Gold Project is located approximately 45 air miles north of Juneau. The mine site is within the City and Borough of Juneau and the Tongass National Forest, and thus is located on federal land overseen by the U.S. Forest Service, as well as on State of Alaska tidelands and on private patented property. The Sherman Creek drainage is a second growth rain forest. The canopy consists of coniferous forest vegetation interspersed with muskeg bogs and alder. Field surveys documented that wetlands exist on all but the steep slopes within the project area. The planned mill site and mine area lie between Ophir and Sherman Creeks at the western base of Lions Head Mountain. The hill above the site is referred to as the "Horrible Hill," after an abandoned mine located in the area. Steep and rugged mountains surround the planned Kensington site. The area between the mine portal and the Lynn Canal is characterized by five to 35 percent slopes and alluvial fans dissected by the drainage. Coeur's application states that approximately 269 acres will be disturbed by the construction and operation of the project. This disturbance will be on both the applicant's private land and on unpatented mining claims located on Forest Service land. A number of surface facilities will be constructed for the Kensington Gold Project. These facilities and the estimated surface disturbance include access roads, a marine terminal, fuel storage, an employee camp, a processing area, mine water and sedimentation ponds, etc.

Access to the mine site is limited to air and water; no road access exists. Mine personnel will be transported primarily by helicopter operating between the Juneau airport and a heliport at Comet Beach at the mine site. On average, two to four flights per day, seven days per week will occur during operations, with more frequent flights during mine construction. Large quantities of equipment and supplies will arrive by barge transport from Juneau and Seattle. Diesel fuel will be delivered in bulk by fuel barges arriving about once a week. Other fuels will be delivered in containers by barge. Barges will also load containers of ore concentrate for shipment off-site.

The proposed mine will produce approximately 2,000 tons of ore per day, as well as waste rock, over an estimated ten-year period. (http://www.juneau.lib.ak.us/cdd/Kensington, last viewed: 7/18/2005)

6.1.14.2 Greens Creek Mine

The Greens Creek Mine is an underground metals mine near Hawk Inlet on northern Admiralty Island. It is located approximately 18 miles southwest of Juneau, Alaska in the Tongass National Forest, within the non-wilderness portion of the Admiralty Island National Monument. Mineralized outcrops near Greens Creek were first sighted in early 1975. Mine development began in 1987 with full production reached in 1989. Due to depressed metal prices, production was suspended in 1993, but started again in 1996. The Greens Creek ore body is a rich massive sulfide deposit that provides polymetallic silver, zinc, gold and lead ore. Greens Creek Mine presently processes in excess of 2,000 tons of ore per day. On an annual basis, that production yields approximately ten million ounces of silver, 65,000 ounces of gold, and a total of 200,000 tons of zinc, lead and bulk concentrates. Measured and indicated reserves as of 2003 are approximately 9 million tons at 11.6 percent zinc, 4.4 percent lead, 15.8 opt silver, and 0.13 opt gold. This ranks Greens Creek as the second largest silver mine in the United States and one of the top silver and zinc deposits in the world. (http://www.kennecottminerals.com/S&E_2003/GreensCreekMine2003.pdf, last viewed: 7/18/05)

Mining is accomplished with a mechanized long-hole or cut and fill method. Milling is done with a SAG mill and ball mill, followed by a standard lead/zinc flotation circuit. The majority of mineral tailings are combined with cement and returned underground as backfill with the remainder being sent to a nearby surface dry tailing storage area. Greens Creek received its Record of Decision to expand its dry tailings facility early in 2004, along with all associated State, federal, and local permits. These permits and EIS approval allow for continued operation and storage of tails produced through the remainder of life-of-mine reserves. http://www.dced.state.ak.us/oed/minerals/pub/web05.pdf

Greens Creek has 13 miles of road, a marine terminal to handle ocean-going vessels, on-site employee shift housing, a mine site with administrative facilities and an ore concentrator. Most employees are transported to and from work daily by boat. Reclamation plans call for facility structure removal, pond removal, portal closure, capping of tailings and waste rock material, and final site contouring in accordance with U.S. Forest Service requirements. There have been many recent facility upgrades, including construction of a southeast tailing liner and under drain system, a new cleaner flotation circuit, and installation of a low Nox turbine electric power generator.

6.1.14.3 Red Dog Mine

Red Dog Mine in northwestern Alaska dominates Alaska mineral production. Red Dog, the largest zinc producer in the world, accounts for nearly 50 percent of the annual value of Alaska's mineral industry. It produces an average of 1.2 million tons of lead and zinc

concentrate annually. The mine is located in the DeLong Mountains of the western Brooks Range within a local government known as the Northwest Arctic Borough, approximately 600 miles north of Anchorage and 55 miles inland from the Chuckchi Sea. Lead and zinc are mined and milled to produce lead and zinc concentrates in a powder form. These concentrates are then hauled year-round from the mine via the De Long Mountain Transportation System haul road to two concentrate storage buildings at the Port Site, where they are stored for later loading onto two barges and then transported over the DeLong Mountain Transportation System (the haul road's official name), to a port site storage facility. The metals are transported year-round, but are stored most of the year while the Chuckchi Sea is choked with ice. (O'Brien, 2001) In 2004, the mine produced 554,000 tons of zinc and 117,000 tons of lead in concentrates, slightly less than in 2003 due to excessive process pipe scaling during the first quarter restricted throughput. Production in 2005 is estimated to be 578,000 tons of zinc and 105,000 tons of lead in concentrates. (Szumigala and Hughes, 2004).

6.1.14.4 Other Mining Sites

Other mineral areas under exploration in Alaska's coastal area include the Port Moller Quadrangle, Woewodski Island polymetallic, Union Bay Copper-platinum, and Duke Island nickel-copper-platinum. On the Seward Peninsula, NovaGold Resources continued advanced exploration on the Rock Creek Gold and the Big Hurrah properties near Nome, and is currently studying taking this project to development phase. The Port Moller Quadrangle encompasses the western Alaskan Peninsula and the eastern Aleutian Islands. The two most advanced epithermal gold projects in the Quadrangle include Centennial, on Popov Island adjacent to Sand Point, with seven million tons averaging about 0.04 ounces of gold per ton in an intermediate sulfidation system occurring as quartz stockworks with pyrite and rare visible gold located below a capping basalt, and the Shumagin and Apollo low-sulfidation, epithermal gold prospects on Unga Island. At the Apollo mine, approximately 145,000 ounces of gold were mined from ore averaging 0.29 ounces of gold per ton from 1891 to 1904. In 2004 exploration for polymetallic massive sulfide prospect continued on the Woewodski Island project. In southeastern Alaska, exploration took place on the Union Bay project near Ketchikan, including reconnaissance rock chip sampling, airborne magnetic and multi-frequency eloctromagnetic surveys and 5,973 feet of diamond core drilling in ten holes. Initial field work returned significant platinum values of ultramarific rock units. The Duke Island nickel-copper-platinum prospect is located in the Prince Rupert quadrangle of southeast Alaska, about 30 miles south of the city of Ketchikan and is currently in the exploration phase. Geochemical, geological and geophysical data suggest the system extends for over 5,000 feet along strike and up to 1,900 feet across strike. Surface samples have returned up to 2.8 percent copper, 0.25 percent nickel and over 1 gram per tonne combined platinum plus palladium. (Geologic Report DK02EXE-1, Summary Report for the Duke Island Cu-NI-PGE Property, Avalon Development Corp., September 20, 2002, Fairbanks, AK)

6.1.14.5 Crushed Rock and Sand and Gravel.

Alaska's glacial history has produced, and continues to produce a high grade of sand and gravel, most of it near coasts, facilitating transportation. (Gilbertson, et al, 2003) Production of sand and gravel in 2003 was about 10.8 million metric tons (Mt), which was a sharp decline from

the 18.4 Mt produced in 2002. Rock production in 2003 was 781,000 t, which also reflected a marked reduction from the 2.9 Mt produced in 2002 (Szumigala, et. al 2004). In the south-central region, sand, gravel, and rock (aggregate) production was about one-half that of 2002 from about one-half as many reporting operations as in 2002; nevertheless, the region was the leading producing region in 2003. About 3.8 Mt was produced from 16 reporting operations. In the eastern interior region, the State's second highest aggregate-producing region with about 3.2 Mt of production, Alaska Department of Transportation and Public Facilities (DOT&PF) projects requiring large amounts of sand and gravel included the Badger Road interchange on the Richardson Highway and a new access route to Tanana Loop on the University of Alaska Fairbanks campus that was named Thompson Drive. About 1.7 Mt of sand and gravel produced in the northern region went for oilfield-related use on the North Slope; slightly more than one-half of that quantity of rock also was produced in this region. Only about 1.3 Mt of sand and gravel production took place in the next highest producing region, the southwestern region. In the southeastern region, slightly more than 1 Mt of rock, sand, and gravel was produced. On the Seward Peninsula near Nome, Nova Gold is considering a plan to produce several million tonnes of sand and gravel along with along with 50,000+ ounces of gold.(www.novagold.net) More than 600,000 t of aggregate were produced in the western region. In the Alaska Peninsula region, a small amount of sand and gravel was produced from Bristol Bay Borough lands. (http://minerals.usgs.gov/minerals/pubs/state/2003/akstmyb03.pdf) The mining of construction sand and gravel provided 170 jobs in 2002.

6.1.14.6 Environmental Issues

6.1.14.6.1 Placer Mining

Placer mining in western Alaska significantly affects wetlands. Placer is a mineral deposit usually located in gravel associated with a stream bed. Mining operations involve retrieval of placer deposits by hand, hydraulic, mechanical, dredging, or drifting methods. A mining operation can be divided into stripping, sluicing, and disposing of tailings.

Small scale placer mining operations can be found throughout the State, with concentrations in the south-central, southwest, and interior regions. As of the late 1980s, about 450 miners actively worked an undetermined number of the approximately 84,000 placer mining claims that exist in Alaska, most on federal lands.

The U.S. Army Corps of Engineers (Corps) estimates that up to 2,250 acres of wetlands per year are lost to placer mining activities (i.e., placement of fill). The Corps only has information on placer mining activities over which it has jurisdiction, however, so this is a conservative estimate. Placer mining activities receded in the period 1989-93, primarily because of depressed gold prices and increased regulation of water quality and effluent discharge by State agencies and EPA. The price of gold has been rising recently, however, and may portend an increase in mining.

Placer mining in Alaska has a long history of causing adverse impacts on fish and

wildlife and their habitats. Siltation, filling of wetlands, and severe alteration of stream channels have often eliminated anadromous and resident fish habitat, impeded or totally blocked fish passage, and in some large scale placer mining areas, totally extirpated local fish stocks. Although the extent of the degradation has not been fully quantified (e.g., number of streams affected, stream miles), it is clear that the loss of biological productivity in streams and adjacent wetlands due to placer mining activity is a major problem. Indeed, some streams are completely dead biologically.

Wetlands and riparian habitats adjacent to placer mined streams are destroyed by excavation of gravel and placer deposits, deposition of overburden and tailings, and construction of berms, ditches, settling ponds, camps, airstrips, and roads associated with mining. Wetland impacts involve direct and indirect losses, as well as functional alteration. Indirect impacts include blockage of natural drainage patterns and displacement of waterfowl, shorebirds, and other terrestrial wildlife species that use wetland areas. (http://www.doi.gov/oepc/wetlands2/v2ch14.html; Last viewed: 7/8/2005)

6.1.14.6.2 Future Mine Sites

More than 75 percent of the Federal land in Alaska is closed to mining because it is located in National Parks, Preserves, Monuments, Wildlife Refuges, or other areas withdrawn from mineral entry. However there are still 49.6 million acres of federal land open to mineral entry. To date, mining activities have converted about 14,500 acres of wetlands in Alaska (eight percent of total wetland losses). Placer mining significantly affects wetlands and accounts for a majority of the losses. (http://www.doi.gov/oepc/wetlands2/v2ch14.html; last viewed 8/22/05) The amount of State land open to mineral entry (95.9 million acres) is nearly the size of the entire State of California. Three out of the four largest illegal industrial spills in Alaska in 2003, including the largest spill of all, were caused by the mining industry. There are currently 35,700 State mining claims and 8,700 federal claims in Alaska and these numbers are set to increase dramatically in what the Lt. Governor has called "Alaska's second gold rush." Upcoming areas of specific concern include the Pebble Project, which is located on State land in the Bristol Bay region of southwest Alaska. This is scheduled to be the largest open pit gold mine, situated just north of Alaska's biggest lake, Lake Iliamna. (www.bettermines.org/alaska.cfm)

6.1.15 Federal and State Recreational Areas

6.1.15.1 Federal Parks, Preserves, and Monuments:

There are 20 National Parks, Wildlife Refuges, Preserves, Forests, Historical Parks and Monuments in Alaska's coastal zone, totaling more than 100 million acres. These include the Alaska Peninsula National Wildlife Refuge, Alaska Maritime National Wildlife Refuge, Aleutian WWII National Historical Park, Aniakchak National Monument and Preserve, Arctic National Wildlife Refuge, Bering Land Bridge National Preserve, Cape Krusenstern National Monument, Chugach National Forest, Glacier Bay National Park and Preserver, Izembek National Wildlife Refuge, Katmai National Park and Preserve, Kenai Fjords National Park, Kenai National Wildlife Refuge, Kodiak National Wildlife Refuge, Lake Clark National Park and Preserve,

Sitka National Historic Park, Togiak National Wildlife Preserve, Tongass National Forest (encompassing the Admiralty Island National Monument), Wrangell-St. Elias National Park and Preserve, and Yukon Delta National Wildlife Refuge. These designated sites include some amazing statistics, including the first and second largest National Forests, the largest National Park, the oldest federally-designated National park, nine of the 16 highest peaks on U.S. soil, and the highest concentration of prehistoric dwellings. Visitation to Alaska's national parks reached a record in 2004, with just under 2.3 million visits. The growth has been particularly large in the southeast Alaska parks. In the last 20 years, Sitka and Glacier Bay have tripled the number of visits. Kenai Fjords has seen an eight-fold increase in visitation, from 30,700 in 1984 to more than 250,000 last year. (NPS, 2004)

Alaska is the only State where subsistence rights are preserved in the national park, wildlife, and forest system. In the early years of federal designation of national parks in Alaska, subsistence was not considered. In 1971, deliberations leading to the Alaska Native Claims Settlement Act (ANCSA) of 1971, the U.S. Congress acknowledged the importance of subsistence hunting and fishing to Native Alaskans, however they provided no specific protection on federal public lands. Nine years later, Congress formally recognized the social and cultural importance of protecting subsistence uses by both Native and non-Native rural residents when it passed the Alaska National Interest Lands Conservation Act of 1980 (ANILCA). This legislation created millions of acres of new national park and preserve additions in Alaska. In addition ANILCA recognized the importance and significance of the cultural and subsistence components in Alaska's ecosystems and incorporated protections into the law to ensure the opportunity for both Native and non-Native Alaskans to engage in a subsistence way of life. However, it excluded Glacier Bay National Park, Kenai Fjords National Park, Katmai National Park, all parks within Alaska's coastal area.

Subsistence resource commissions have since been established for most national parks and monuments in Alaska to provide meaningful participation and involvement of local subsistence users in planning and management decisions affecting subsistence.

6.1.15.2 State Parks

Alaska holds almost one-third of the United States' state park acreage. There are 121 State parks stretching across the entire State covering a total of 3,353,485 million acres, as of 2005. Six of these parks are undeveloped marine parks. These parks feature a wide variety of sites that are important historical landmarks, protected natural environments or both simultaneously. Some parks offer nothing but wild, untamed nature; some, baseball and volleyball fields; others, restored villages and artifacts. Every year, about six million visitors – 25 percent from outside the State–are attracted to Alaska's State parks. Sixty-six of these parks are either entirely or partially located within the State's coastal area. (http://www.dnr.state.ak.us/parks/units/)

Four non-subsistence zones overlap in part with various coastal district boundaries and include 33 State park units. Of the 33 remaining State park units located both within a coastal

district boundary and outside of a non-subsistence zone, four park units support subsistence use activities. The Wood-Tikchik Park near Dillingham in western Alaska includes caribou, moose and bear hunting as well as salmon fishing and berry picking. In the Wood-Tikchik State Park, sport fishing and recreational activities equal the subsistence use activities. Two additional parks within the State park system located on Shuyak and Afognak Islands near Kodiak Island also support subsistence hunting and fishing, although the subsistence uses occur less frequently than do the recreational activities. Some subsistence use activity takes place in a portion of the Kachemak Bay State Park near the villages of Nanwalek and Port Graham.

State parks are primarily accessed for a variety of sport and recreational activities. Of the State park units located outside of the "non-subsistence zones," a small number support subsistence uses. As a result, "subsistence uses" by coastal residents within the State park system are minimal except in the noted State park units.

6.2 Socio-Economic Environment

More than 75 percent of Alaska's 650,000 residents live on the coastline. Other than the Anchorage-Kenai Peninsula region, most of the 100 plus communities in Alaska are not road-connected. Salmon, herring, halibut, and blackcod fishing are the economic backbone of many communities. Tourism and shellfish aquaculture are growing sources of economic diversification, as is seafood processing. Alaska's coastal residents depend on the marine and freshwater resources of their regions for their cash income, subsistence economy, and cultural and recreational well-being. Sustainable use of marine resources is critical to the future of coastal Alaska. (http://www.uaf.edu/map/community/index.html; last viewed 7/15/04)

6.2.1 Local District Coastal Management Programs

With the passage of the ACMA of 1977, the State of Alaska, municipalities, and regions began to cooperatively manage the uses and protection of Alaska's resources. Alaska's decision to participate in coastal zone management was in part the result of ambitious plans for federal oil and gas leasing off Alaska's coasts. Several federal agencies also managed large portions of Alaska (*See* section 6.2.2) and Alaska's offshore areas, affecting the economies and lifestyles of local communities. Coastal communities argued strongly for a voice in any decisions that might affect their livelihood and lifestyle. From its inception in 1972, the CZMA provided Alaska and its coastal communities with an effective forum for resolving local issues. The ACMP received federal approval in 1979.

The original ACMP established the CPC, which determined the ACMP's direction, guided development of the ACMP, and monitored its operation. Staff from the Division of Government Coordination (DGC) (now DNR) assisted the CPC in carrying out its duties. The CPC approved the first district coastal management program in 1980. The ACMP now includes 33 coastal districts with approved coastal management plans and more than 20 special area plans.

A coastal district is either a municipality with all or part of its boundary within the

coastal zone or a coastal resource service area (CRSA) in the unorganized borough. The distinction between these two types of districts deals with their ability to conduct planning and apply land use controls. Municipalities are incorporated areas pursuant to Title 29, A.S. These areas, which are either boroughs or cities, can exercise planning, platting, zoning, and land use regulation. Under the original ACMP, CRSAs were created in order to provide for the development of district plans for portions of the "unorganized borough," which includes much of rural areas, where no incorporated governments exist. These areas do not have the authority to develop traditional land-use planning, platting and zoning controls.

A coastal resource district that has and exercises zoning or other controls on the use of resources within the coastal area directly implements its district coastal management plan. Implementation is in accordance with the comprehensive use plan or the statement of needs, policies, objectives, and standards adopted by the district. In addition, the State agencies are similarly obligated to implement the coastal district plan. For a coastal resource district that does not have or exercise zoning or other controls on the use of resources within the coastal area, that district's coastal plan is implemented through the ACMP by appropriate State agencies as provided in AS 46.40.096. There are currently four approved CRSAs: Aleutians West, Bering Straits, Bristol Bay, and Cenaliulritt. Thus for either Title 29 jurisdictions or CRSAs, management of uses takes the form of direct State regulation.

A coastal district has four main responsibilities: (1) develop a coastal management program for its area; (2) participate in the consistency review process by using its enforceable policies in its approved program for coastal development projects; (3) educate the members of its community about coastal management; and (4) implement its coastal management program at the local level. Municipal coastal districts can voluntarily choose to participate in the ACMP. Also governed by local ordinances, these municipal coastal districts with planning powers may also conduct local consistency reviews for projects affecting their coastal zones.

Under their mandate to manage coastal resources, coastal districts may also participate in other activities and planning efforts. Coastal districts may contribute information and resources during consistency reviews to DNR Area Plans, and to DEC oil spill response planning; may provide public education and outreach efforts on coastal resources and activities; and may participate in special ACMP-funded projects.

6.2.2 Land Ownership

Current land ownership in Alaska can be traced back to three main events in the State's history:

- Russian traders arrived in Alaska in the mid 1700's and established small scattered trading posts and settlements. Native Alaskans (the Eskimo, Indian, and Aleut peoples) continued as the primary "landowners" during this period of Russian occupation. On October 18, 1867, Russia sold Alaska to the United States government. As a result, the Federal government owned the Alaska Territory, approximately 375 million acres (about one-fifth the size of the continental U.S.)

- Alaska became a State in 1959. The Federal government granted the new State 28 percent ownership of its total area. Approximately 103,350,000 acres were selected under three types of grants: Community (400,000 acres); National Forest Community (400,000 acres), and General (102,550,000 acres). Additional territorial grants for schools, university and mental health trust lands totaling 1.2 million acres were confirmed with statehood. All grants combined gave the State of Alaska approximately 105 million acres.

- In 1971 Congress passed the ANCSA. This law granted 44 million acres and one billion dollars to village and native corporations created under the act. Generally, ANCSA gave Native selections priority over State land selections.

6.2.2.1 State Land

To date, the State has received patent to approximately 85 percent (90 million acres) of its total land selections. The State was permitted to select lands from any federal land not already reserved for other uses to provide (1) land and resources to support the State's economy for road construction, economic development and building houses, schools, and other public and private facilities; and (2) a reduction in federal control over State internal affairs by giving the State ownership and jurisdiction over its own land. The State chose the land to meet three specific needs: settlement, resources, and recreation.

First, the State of Alaska selected land to encourage development and settlement. Land for public facilities, road construction and other public needs were included. Once owned, the State transfers large tracts of land to local governments, and leases and disposes of land to the private sector. There are approximately 580,000 acres currently in the State's land disposal bank for eventual lease or sale. Second, lands were selected for agriculture, forestry, commercial fisheries, mining potential, oil and gas development, and wildlife habitat because in large part, the Alaskan economy is based on exploration for and the development of natural resources. Third, lands for wildlife, back-country recreation, and varying degrees and types of developed recreation were chosen and reserved to provide for a variety of experiences for Alaskans and the tourist industry.

Once land is selected, land planners develop State land use plans. Planners consider laws and policies set by the Governor and State legislature. The character of the land itself, recommendations made by resource experts, and public input determine the most appropriate management of currently owned or selected State land. Plans are developed for land in selected status in anticipation of its conveyance to the State.

6.2.2.2 Federal Land

The Federal government is still the largest landowner in Alaska with 60 percent of the

total area (222 million acres). This acreage includes national parks, wildlife refuges, national forests, military reservations and the North Slope National Petroleum Reserve. More than a dozen federal agencies management federal lands in Alaska.

The majority of federally-owned lands have been set aside for public use (approximately 80 million acres). These are designated as follows:

- The NPS and USFWS manage about 119.3 million acres (48.3 and 71.0 million acres respectively) for primary uses of resource protection and fish and wildlife conservation.

- The Forest Service and BLM manage about 97.7 million acres (19.8 and 77.9 million acres respectively) for multiple use purposes including timber production, fish and wildlife, recreation, water and mining. Management of these lands is based on priorities and compatibility among various uses.

The remaining federal land is designated for special purposes, such as military reservations, the National Petroleum Reserve and U.S. Postal Service lands.

6.2.2.3 Native Alaskan Lands

Native Alaskan lands are private lands. ANCSA mandated the creation of regional and village Native corporations for the disbursement of the 44 million acres and payment of one billion dollars mandated to Native ownership.

Thirteen regional corporations were created for the distribution of ANCSA land and money. Twelve of those shared in selection of 16 million acres. The thirteenth corporation, based in Seattle, received a cash settlement only. 224 village corporations of 25 or more residents shared 26 million acres. The remaining acres, which include historical sites and existing native-owned lands, went into a land pool to provide land to small villages of less than 25 people.

6.2.2.4 Other Private Land

Land in private ownership (other than Native Alaskan land) comprises less than one percent of the total land in Alaska. Much of the best land for development around Alaska's communities is, or will be, privately owned. Private land development meets people's needs by providing places to live, work, shop and recreate. It also provides a tax base for cities and communities to help support public services. (DNR, 2000)

6.2.3 Population

The population projections discussed in this section were gathered from the February

2005 article in "Alaska Economic Trends" by Gregory Williams, State Demographer. This article should be referred to for all assumptions regarding change, such as mortality, fertility, population migration and policy influences.

6.2.3.1 Projections 2005-2029

Beginning with a 2004 population of 655,435, the middle series population forecast for year 2005 is 662,604. Under certain assumptions, the population in the succeeding years is projected to be 692,001 in 2009; 727,003 in 2014; 758,170 in 2019; 783,452 in 2024; and 801,904 in 2029. The implied annual growth rate ranges from approximately 1.11 - 0.39 percent, most of which is from natural increase rather than migration. Through the projections period to 2029, births would increase from 10,054 to 11,311 annually, and deaths would increase from 3,137 to almost 5,857 annually.

6.2.3.2 Age Patterns

Alaska's median age increases from 33.4 to 35.8 during the projection period. The aging of the baby boom generation is a dominant factor throughout the period. As the generations who came to Alaska before the TAPS era dwindle and the number of older women increases, the

gender ratio of Alaska will approach that of the nation as a whole. The gender ratio can be expected to drop from 106 males per 100 females in 2004 to 100 by 2029.

The burden of dependency for individuals and the State is also expected to increase sharply during the projection period. In 2004, each 100 Alaskans of working age will be supporting about 50 children and 31 elders. So while the total burden of dependency for each 100 Alaskans in 2004 is about 56 persons, by 2029 that burden will reach 81 persons. There is no decline in child dependency, but a tripling of age dependency. With nationwide pressure on medical costs, Social Security, Medicare, and Medicaid, demographics would indicate strong pressures on the resources of working age and older populations.

The projected population 16 years and over represents the State's potential future labor supply, with 16-64 the prime working ages. The working age population, of course, is always larger than the employed civilian labor force because some may not be working or seeking work. Those in the military are not included. Neither are the unemployed. So of the 467,726 persons over 16 years in 2000, only 319,890, or about 70 percent, were in the civilian nonfarm labor force. Persons 16-64 numbered about 420,800 in 2000. The key working ages in fact begin to level out at 471,000 as early as 2011. This number is expected to rise slowly to 473,600 by 2017, after which it is expected to decline to about 467,700 at the end of the projections period. Opportunities for younger workers may become tighter between 2005 and 2010. The period

2010–2015 should provide advancement opportunities for younger Alaskans as boomers in senior positions begin to retire in large numbers.

The most noticeable and most certain population growth during the next 25 years will be

that of Alaska's elders. In 2000 the number of Alaskans over 65 was about 36,000. It has increased to 41,600 currently. It is expected to increase to 52,300 in 2009; 70,400 by 2014; 94,800 by 2019; 119,200 by 2024; and 137,800 by 2029. This group is currently increasing at about four percent annually. The rate of growth for this group is expected to increase to five to six percent annually between 2008 through 2020. In 2012, it is forecast to increase by 7.4 percent with the retirement of the leading edge of the baby boom. Facilities, as well as medical, professional, and social services to serve this population, will need to expand at a corresponding rate. The impact of the rapidly increasing numbers of older residents may be greater than elsewhere, because Alaska, with its historically younger population and relatively small number of elders, has fewer existing resources to serve the elderly.

6.2.3.3 Migration

Of all the variables affecting population growth, the most unstable is migration. Migration trends can change direction quickly in a place like Alaska, depending on the prosperity of the State's economy in relation to that of states that provide or receive most of Alaska's in- and out-migrants. In the recent past, 44 percent of in-migration to Alaska has come from the Pacific and Mountain states and another 27 percent from the South Atlantic and West South Central Regions. The states that contribute the most migrants to Alaska are currently: Washington (10.4 percent), California (9.0 percent), Texas (7.3 percent) and Oregon (4.7 percent). In the 2002-2003 period, in-migration in Alaska fell by about 75 percent from the previous year, to 513, still above the negative numbers for 1999–2000 and 2000–2001. In the early 1990s Alaska added about 9,600 persons each year through natural increase, while in 2002–2003, natural increase was only 6,800. This continues the trend of lower birth rates and higher death rates as Alaska's baby boomers age. Net migration (in-migration minus out-migration) accounted for a loss of 177 persons.

Since 2000, the Municipality of Anchorage and the Matanuska-Susitna (Mat-Su) Borough have accounted for virtually all of the population growth in the State, with Anchorage supplying 62.7 percent and Mat-Su supplying 37.2 percent. The increase in both boroughs was due to a mix of natural increase and migration, with most of the migration coming from other parts of Alaska. Mat-Su was the only area of the State whose growth came primarily from in-migration. In-migration (mainly from Anchorage) accounted for 6,471 of Mat-Su's 8,151 population increase. Mat-Su has been the fastest growing area of the State since 1990, growing at an average rate of about four percent.

Most of Alaska's boroughs and census areas have grown slowly or lost population since 2000. The largest increases in population occurred in the Municipality of Anchorage (+13,720), Mat-Su Borough (+8,151), Kenai Peninsula Borough (+1,529), Bethel Census Area (+728) and the Juneau City and Borough (+572). Most of the other boroughs and census areas experienced out-migration or remained unchanged. The only boroughs to have noticeable net in-migration were Mat-Su Borough, Anchorage Municipality, and Kenai Peninsula Borough. The southeast region continued to have the largest overall decline, with a loss from net migration exceeding natural increases. Only Juneau and Sitka had small population growth. Migration out of southwestern Alaska and the northern region was less than natural increase in the regions. In the

Gulf Coast, Kodiak again had more out migration than natural increase and Valdez-Cordova gained slightly, due to natural increase slightly greater than the net migration loss. (Alaska Economic Trends, March 2004, J. Gregory Williams)

6.2.3.4 Ethnic Diversity

Population statistics are based on the 2000 census for the entire State (not just the coastal area). Within the entire State, 69 percent were white, 19 percent were Native Alaskan, and 12 percent were Black, Asian or Pacific Islander, and mixed race (other than Native Alaskan). The Native Alaskan population nearly tripled between 1960 and 2000, increasing from 42,522 in 1960 to 119,241 in 2000. This is an average growth rate of 2.6 percent a year, and 29 percent a decade, since Alaska became a state.

The Native Alaskan share of the population was also at 19 percent in 1960, but then declined to around 17 percent during the 1970s and 1980s, as tens of thousands of non-Natives moved to the State to take advantage of the many new jobs being created at that time. In the 1990s, as the economy slowed and fewer non-Natives moved in, the Native share of the population rebounded to 19 percent. The Native Alaskan population grew most rapidly during the 1970s. Growth slowed after that, but the number of Native Alaskans has continued to increase. Because relatively few Native Alaskans leave Alaska, variation in the growth rate of Native population over time is primarily due to changes in the rate of births and deaths.

Alaska's indigenous people are divided into eleven distinct cultures with 20 different languages. They live in cities, towns and villages separated by vast distance and unique geographical regions.

Aleut and Alutiiq

The area stretching from Prince William Sound west along the Gulf of Alaska to the Aleutian Islands is home to the Aleut and Alutiiq peoples. The natural marine environment defines subsistence lifestyles and cultures that date back more than 8,000 years ago. The Aleuts and the Alutiiq differ in language and culture but a commonality was created from the first contact with the Russians in the 18th century that is evident today. The Alutiiq language, called Sugcestun or Alutiiq, is one of the Yupik branches of the Esk-Aleut language family. The Alutiiq are known for their skill in building and handling kayaks or baidarka, as the Russians called it. The Aleut, also known as Unangan, are known for being expert boat builders and sailors and well known for their kayaks. The Aleut language, Unangax, also derives from the Esk-Aleut family.

Athabascan (Indian)

Athabascan Indians live in interior Alaska and have the largest land base of any other Native Alaskan group. The Athabascan are efficient hunters and fishers, and the moose, caribou,

salmon and the birch tree are the most important resources. These provide food, clothes and shelter. In summer, they spend a great deal of time at their fish camps along major river systems - including the Yukon, Tanana, Innoko, Chandelar, Koyokuk and Tolovana rivers. In winter, they hunt caribou, moose and smaller animals. There are 11 different languages spoken by Alaskan Athabascans.

Inupiaq and St. Lawrence Island Yupik (Eskimo)

The Inupiaq & St. Lawrence Island Yupik live in a region that stretches from the St. Lawrence Island to the northern Canadian border and beyond. Their territory also includes most of the Brooks Range. Today, as in the past the food is determined by the region and season of the year. The hunter/gatherer societies are based largely on an active subsistence hunting and traditional use of foods such as, berries, salmon, moose, whale, walrus, seal, duck, and other marine mammals to provide substantial portions of their diet.

Tlingit, Haida, Eyak and Tsimshian (Indian)

These four Indian groups of southeastern Alaska are considered to be a part of the Pacific Northwest coast culture area. Each group speaks their own language and has their own clan systems. The four cultures are similar in the use of art and oral traditions, complex legal and social systems based upon matrilineal clans and salmon harvesting. They share a similar use of art and are known for their totem poles and dramatic carvings.
(http://www.anchorage.net/588.cfm, last viewed: 7/20/2005)

Yup'ik and Cup'ik (Eskimo)

The Yup'ik & Cup'ik people, named after the two main dialects of the Yup'ik language, live in southwestern Alaska from Bristol Bay along the Bering Sea coast to Norton Sound. The availability of fish, game and plants determined the location of seasonal camps and villages. Yup'ik & Cup'ik are hunters of moose, caribou, whale, walrus, seal and sea lions and harvest salmon and other fish from the Yukon, Kuskokwim and Nushagak rivers. Bird eggs, berries and roots help sustain people throughout the region.

The summer and fall seasons focus on gathering food and hunting while the winter season is for traditional ceremonies and festive events.

Growth in the State's non-Native population has fluctuated over the decades, but unlike the Native population, the non-Native population tends to fluctuate with economic conditions. When conditions are good and employment opportunities are expanding, the non-Native population grows because more people move to the State. When employment growth is slower, as it was in the 1990s, the non-Native population also grows more slowly. About a third of Alaska's population growth between 1990 and 2000 was among Native Alaskans.

6.2.3.5 Geographic Distribution of the Native Alaskan Population

By far the most populous region is Cook Inlet, where more than 30 percent of all Alaska Natives live and which includes the city of Anchorage and surrounding areas. Next largest is Calista, with 17 percent of the Native population, followed by Sealaska and Doyon with around 12 percent each of the Native population. In several regions, Arctic Slope, Bering Straits, Bristol Bay, Calista, and NANA, Natives make up most of the total regional population. In other regions, they make up anywhere from about 10 to 28 percent of the total population.

In 2000, 50,426 Native Alaskans, or 42.5 percent of their population, lived in urban areas, which are defined to include Anchorage, the Matanuska-Susitna Brough, the Kenai Peninsula Borough, Fairbanks, and Juneau. (Status of Alaska Natives, 2004) The other 58 percent of Native Alaskans lived in rural areas, which are divided into two regions: "remote rural" and "other rural." In northern and western Alaska there are eight remote rural census areas far off the road and ferry systems. In 2000, these remote census areas were home to 49,344 Native Alaskans, or 41.5 percent of the total. The remaining 16 percent, 19,471, lived in other rural areas. These areas are still rural, but are somewhat more accessible by road or ferry than the remote areas. They include southeast Alaska (except for Juneau); south-central Alaska (excluding the urban areas); the two census areas on the Aleutian chain; and Bristol Bay.

Within those remote areas are five regional centers where the non-Native population is concentrated: Barrow, Kotzebue, Nome, Bethel, and Dillingham. Those larger communities serve as trade, transportation, communication and service hubs for the surrounding areas. In the remote population outside the regional centers, 90 percent of the people are Native Alaskan, mostly living in 148 small villages with populations of less than 1,000.

Table 1 provides a list of all the boroughs and small villages that are within the State's coastal area, the percentage of Native Alaskans and American Indians within the coastal area, and other information.

6.2.3.6 Implications of Demographic Trends for 2010 and Beyond

During the 1990s, Native Alaskans increased their share of the State population, up from 17 percent in 1990 to 19 percent in 2000, and it is expected that that trend will continue in the coming decades. The rate of "natural increase" (i.e., births over deaths) among Native Alaskans fell in the last decade, but in 2000 it was still about 50 percent higher than the rate among non-Natives. Unless substantial numbers of non-Natives move into the State, as they did in the decades after statehood, the faster growth rate among Natives means that their share of the population will continue to increase.

TABLE 1: ALASKA COASTAL COMMUNITY INFORMATION

(Sources: ACMP list of coastal communities and Alaska Department of Community and Economic Development's Community Profiles; *See* Note* on page 176)

Borough or Census Area	Population	%Native/Part Native	Unemployment Rate	Mean Income/Per Capita	% Below Poverty Level	Subsistence
Anchorage	274,003	10.4%	5.7%	$27,852	7.4%	19#/person
Bethel Census Area	16,774	85.5%	15.4%	$24,400	20.6%	402#-1,328#/person
Bristol Bay Borough	1,105	36%	11.2%	$42,000	9.5%	188#-299#/person
Dillingham Census Area	4,912	76.2%	12.%	$27,900	24.4%	242-830#/person
Haines Borough	2,327	15.6%	12.5%	$24,900	11.7%	196#/person
Juneau	31,283	16.6%	6.2%	$29,200	6%	35#/person average
Kenai Peninsula Borough	50,980	10.2%	11.4%	$20,949	10%	Yes
Ketchikan-Gateway Borough	13,548	19.1%	8.9%	$33,700	6.5%	35#/person average
Kodiak	13,811	17.6%	10.3%	$26,300	6.6%	151#-451#/person
Mat-Su Borough	67,473	8.6%	9.1%	$13,400	11%	27#-312#/person
Nome Census Borough	9,370	79.1%	15.2%	$25,100	17.4%	240#-997#/person
North Slope Borough	7,234	73.8%	13.8%	$75,900	9.1%	289#-890#/person
Sitka	8,891	24.7%	6.5%	$28,500	12.8%	206#/person
Skagway-Hoonah-Angoon	3,164	39.5%	5.7%	$25,000	12.8%	48#-608#/person
Valdez-Cordova	10,230	17.3%	11.3%	$28,300	9.8%	80#-149#/person
Wrangell-Petersburg	6,336	22.6%	11.3%	$26,500	7.9%	155#-312#/person
Yakutat	691	46.8%	16.7%	$32,000	13.5%	398#/person
Town	**Population**	**% Native/Part Native**	**Unemployment Rate**	**Mean Income/ Per Capita**	**% Below Poverty Level**	**Subsistence**
Adak	150	37.3%	7.55%	$52,727/$31,747	4.66%	No
Akiachak	633	96.4%	25.5%	$35,833/$8,321	21.16%	Yes
Akiak	337	95.1%	16.48%	$26,250/$8,326	33.94%	Yes
Akutan (	787	16.4%	83.89%	$33,750/$12,259	45.48%	Yes
Alakanuk	666	97.9%	21.47%	$26,346/$6,884	33.84%	Yes

Ambler	291	86.7%	27.88%	$43,500/$13,712	14.29%	Yes
Angoon	505	86.4%	12.95%	$29,861/$11,357	27.92%	Yes
Aniak	551	73.3%	13.11%	$41,875/$16,550	14.04%	Yes
Atka	95	91.3%	0%	$30,938/$17,079	7.53%	Yes
Atmautluak	279	95.9%	10.83%	$37,917/$8,501	30.28%	Yes
Attu Station	24	0%	0%	$0/$26,964	0%	No
Brevig Mission	314	92%	2.44	$21,875/$7,278	48.36%	Yes
Buckland	410	96.8%	33.8%	$38,333/$9,624	11.92%	Yes
(Cape) Chiniak	49	4%	0%	$14,167/$22,211	20%	No
Chefornak	434	98%	11.94%	$35,556/$8,474	25.07%	Yes
Chenega Bay	99	77.9%	14.81%	$53,750/$13,381	15.58%	Yes
Chevak	884	95.9%	15.07%	$26,875/$7,550	29.49%	Yes
Chignik	89	60.8%	35.19%	$34,250/$16,166	4.49%	Yes
Chignik Lagoon	92	82.5%	0%	$92,297/$28,940	1.8%	Yes
Chignik Lake	113	87.6%	8.57%	$41,458/$13,843	21.97%	Yes
Coffman Cove	163	6%	10.48%`	$43,750/$23,249	4.85%	No
Cold Bay	95	17%	33.33%	$55,750/$20,037	27.27%	No
Craig	1,174	30.9%	8.99%	$45,298/$20,176	9.84%	Yes
Cube Cove	unavailable	1.4%	6%	$51,875/$27,920	0%	unknown
Deering	131	94.1%	16.98%	$33,333/$11,000	5.76%	Yes
Diomede	129	93.8%	2.17%	$23,750/$9,944	35.44%	Yes
Edna Bay	45	4.1%	0%	$44,583/$58,967	23.08%	No
Eek	290	96.8%	17.91%	$17,500/$8,957	28.85%	Yes, 80-90% diet
Egegik	84	76.7%	27.59%	$46,000/$16,352	6.9%	Yes
Elfin Cove	32	0%	23.08%	$33,750/$15,089	5.56%	No
Elim	341	94.9%	26.02%	$40,179$10,300	7.87%	Yes
Emmonak	763	93.9%	23.05%	$32,917/9,069	16.24%	Yes

Excursion Inlet	12	0	50%	$16,250/$18,188	25%	No
False Pass	69	65.6%	0%	$49,857/$21,465	8%	Yes
Gambell	647	95.8%	19.48%	$31,458/$8,764	28.47%	Yes
Golovin	146	92.4%	3.51%	$31,875/$13,281	4.35%	Yes
Goodnews Bay	245	93.9%	13.24%	$16,250/$6,851	38.98%	Yes
Gustavus	438	8.2%	14.03%	$34,766/$21,089	14.59%	No
Hobart	1 (?)	33.3%	0%	$68,750/$34,900	0%	No
Hollis	178	9.4%	3.08%	$43,750/$17,2789	9.29%	No
Hooper	1,115	95.8%	37.27%	$26,667/$7,841	27.94%	Yes,
Hydaburg	370	89.5%	31.3%	$31,625/$11,401	24.12%	Yes
Igiugig	50	83%	0%	$21,750/$13,172	6.9%	Yes
Iliamna	92	57.8%	0%	$60,625/$19,741	3.1%	Yes
Ivanof Bay	3	95.5%	0%	$91,977/$21,983	0%	Yes
Kake	682	74.6%	24.85%	$39,643/$17,411	14.61%	Yes
Kasaan	55	48.7%	20%	$43,500/$19,744	0%	Yes
Kasigluk	529	96.7%	21.31%	$31,500/$7,194	22.75%	Yes
Kiana	408	92.8%	11.61%	$39,688/$11,534	11.24%	Yes
King Cove	737	47.9%	6.44%	$45,893/$17,791	11.93%	Yes
Kipnuk	649	98%	33.98%	$34,375/$8,589	20.89%	Yes
Kivalina	388	96.6%	25.45%	$30,833/$8,360	26.4%	Yes
Klawok	851	58.1%	15.65%	$35,000/$14,621	14.25%	Yes
Klukwan	114	88.5%	44.83%	$30,714/$11,612	1.53%	Yes
Kobuk	125	93.6%	0%	$30,750/$9,845	28.57%	Yes
Kokhanok	182	90.8%	11.36%	$19,583/$7,732	42.61%	Yes ,
Kolignaek	200	87.4%	13.16%	$44,583/$13,242	19.31%	Yes
Kongiganak	401	97.2%	3.5%	$33,250/$9,881	13.77%	Yes
Kotlik	609	96.1%	24.37%	$37,750/$7,707	21.12%	Yes

Kotzebue	3,076	76.7%	9.8%	$57,163/$18,289	13.14%	Yes,
Koyuk	340	94.3%	34.58%	$30,417/$8,736	27.99%	Yes
Kupreanof	30	0%	0%	$45,833/$26,651	0%	Yes
Kwethluk	730	94.8%	15.76%	$25,417/$6,503	29.52%	Yes
Kwigillingok	343	97.9%	23.44%	$36,250/$7,577	34.7%	Yes
Levelock	71	95.1%	0%	$18,750/$12,199	24.55%	Yes
Lower Kalskag	267	95.5%	42.05%	$25,625/$7,654	40.63%	Yes
Marshall	368	97.7%	18.52%	$32,917/$9,597	28.6%	Yes
Mekoryuk	205	96.7%	19.79%	$30,833/$11,957	21.88%	Yes
Metlakatla	1,398	89.7%	20.85%	$43,516/$16,140	8.01%	Yes
Meyers Chuck	18	9.5%	0%	$64,375/$31,660	0%	Yes
Mountain Village	750	93.5%	30.77%	$31,250/$9,653	22.19%	Yes
Napakiak	380	96.6%	22.31%	$28,750/$7,319	20.18%	Yes
Napaskiak	419	98.2%	2.94%	$31,806/$8,162	20.23%	Yes
Naukati Bay	109	9.6%	29.09%	$27,500/$15,949	9.45%	No
Nelson Lagoon	64	81.9%	46.15%	$43,750/$27,596	6.41%	Yes
Newhalen	167	91.3%	31.25%	$36,250/$9,447	16.3%	Yes
Newtok	329	96.9%	24.63%	$32,188/$9,514	30.99%	Yes
Nightmute	228	94.7%	16.04%	$35,938/$9,396	10.7%	Yes
Nikolski	41	69.2%	0%	$38,750/$14,082	20.69%	Yes
Noatak	469	96%	25.35%	$30,833/$9,659	22.04%	Yes
Nondalton	217	90%	37.33%	$19,583/$8,411	45.41%	Yes
Noorvik	649	95%	19.56%	$51,964/$12,020	7.57%	Yes
Nunapitchuk	498	95.9%	17.18%	$29,286/$8,364	20.73%	Yes
Oscarville	62	100%	0%	$8,125/$5,825	40%	Yes
Pedro Bay	45	64%	0%	$36,750/$18,419	6%	Yes
Pelican	113	25.8%	7.95%	$48,750/$29,347	4.73%	No

Perryville	106	98.1%	11.11%	$51,875/$20,935	16%	Yes
Pilot Point	70	86%	7.69%	$41,250/$12,627	20.83%	Yes
Pilot Station	564	97.6%	32.12%	$31,071/$7,311	28.73%	Yes
Pitka's Point	107	93.6%	25%	$41,875/$10,487	32.23%	Yes
Platinum	40	92.7%	27.27%	$21,250/$7,632	22%	Yes
Point Baker	33	8.6%	0%	$28,000/$12,580	4.88%	Yes
Port Alexander	70	13.6%	9.38%	$31,563/$14,767	22.9%	Yes
Port Alsworth	105	22.1%	4.92%	$58,750/$21,716	6%	No
Port Clarence	22	0%	0%	0/$35.286	5.98%	No
Port Heiden	87	78.2%	16.67%	$31,875/$20,532	5.6%	Yes
Port Protection	57	11.1%	0%	$10,938/$12,057	57.5%	Yes
Quinhagak	579	97.3%	15.44%	$25,145/$8,127	26.1%	Yes
Russian Mission	310	93.9%	21.7%	$27,500/$8,358	21.77%	Yes
Sand Point	947	44.2%	30.79%	$55,417/$21,954	16.03%	Yes
Savoonga	704	95.5%	37.36%	$23,438/$7,725	29.06%	Yes
Scammon Bay	470	97.4%	12.8%	$25,625/$7,719	37.36%	Yes
Selawick	821	95.3%	34.34%	$25,625/$8,170	34.38%	Yes
Shaktoolik	223	94.8%	27.66%	$31,875/$10,491	6.09%	Yes
Sheyma Station	27	0%	0%	$0/$0	0%	No
Sishmaref	594	94.5%	16.43%	$30,714/$10,487	16.27%	Yes
Shungnak	264	94.5%	27.52%	$44,375/$10,377	35.79%	Yes
Saint George	149	92.1%	3.8%	$57,083/$21,131	7.86%	Yes)
Saint Mary's	585	87.6%	11.34%	$39,375/$15,837	20.41%	Yes
Saint Michael	413	93.2%	21.24%	$33,036/$10,692	22.88%	Yes
Saint Paul	539	86.5%	14.98%	$50,750/$18,408	11.87%	Yes
Stebbins	570	94.7%	22.6%	$23,125/$8,249	41.88%	Yes
Sunrise	15	11.1%	0%	$56,250/$56,000	0%	No

Tatitlek	111	85%	7.89%	$36,875/$13,014	24.21%	Yes
Tazlina	192	30.2%	12.82%	$56,000/$23,992	8.11%	Yes
Teller	242	92.5%	14.71%	$23,000/$8,618	37.7%	Yes
Tenakee Springs	106	4.8%	13.73%	$33,125/$20,483	11.76%	No
Thorne Bay	480	4.8%	14.6%	$45,625/$20,836	7.81%	Yes
Toksook Bay	572	97.6%	15.31%	$30,208/$8,761	27.33%	Yes
Tuluksak	464	94.2%	16%	$31,563/$7,132	27.85%	Yes
Tuntutuliak	381	98.9%	14.66%	$25,500/$7,918	23.03%	Yes
Tununak	304	96.9%	19.81%	$25,000/$7,653	30.77%	Yes
Ugashik	12	81.8%	0%	$28,750/$12,530	10%	Yes
Unalakleet	741	87.7%	14.57%	$42,083/$15,845	11.04%	Yes
Unalaska	4,388	9.3%	13.4%	$69,539/$24,676	12.46%	No
Wales	158	90.1%	18.92%	$33,333/$14,877	18.3%	Yes
Whale Pass	67	3.4%	0%	$62,083/$24,041	0%	Yes
White Mountain	214	86.2%	18.75%	$25,833/$10,034	22.38%	Yes
Whittier	178	12.6%	15.89%	$47,500/$25,700	7.1%	No

One important implication of the projected growth among Native Alaskans is that the size and composition of the Native labor force (the working age population) will be changing. In 2000, there were about equal numbers of Natives in their 20s, 30s, and 40s (according to Census figures). It is predicted that by 2010, the number of Natives in their 20s in the labor market will increase dramatically, as will the number in their 50s. By 2020, the labor market will be dominated by Natives in their 20s and 30s. Between 2000 and 2010, 11,700 Natives will join the labor force; a 26 percent increase, and the new workers will be concentrated in age groups from 20 to 30. Between 2010 and 2020, the labor force will grow at only 11 percent, adding about 6,700 workers, and the average age will increase only slightly. If migration trends of the last ten years continue, the Native Alaskan population in 2010 will continue to concentrate in urban Alaska, boosting the share of the Native population in urban areas from 42 percent in 2000 to 53 percent in 2020. At the same time, the share in remote areas would fall from 41 percent in 2000 to 35 percent by 2020. In other rural areas, the share would drop from about 16 to 12 percent. (Goldsmith, et.al, 2004)

6.2.4 Economy

The Alaskan economy is based primarily on its natural resources: oil and gas, seafood, minerals, its scenic beauty and timber. The oil and gas sector dominates the economic base, accounting for approximately 49 percent of the business that creates new wealth. Only the oil and mining industries provide a year-round source of income to the State and require full-time operation. The State's oil industry operates production wells in Cook Inlet and on the North Slope. North Slope oil is pumped 800 miles through the TAPS to Valdez for shipment to refineries in the lower 48 states. The majority of new oil exploration work is being conducted on the North Slope. The mining industry is scattered across the State with a zinc mine near Kotzebue, a coal mine at Healy, a silver mine near Juneau, and a major gold mine north of Fairbanks. Numerous smaller mining ventures exist across the State. Seafood exports have been hurt by competition with farmed salmon and poor Pacific Rim market conditions. Timber industry exports have also suffered from these poor market conditions. (2002 AK Economic Performance Report). Other important sectors of the economy include tourism and support industries (e.g., construction, transportation, communication, utilities, retail trade, services, finance, insurance, real estate), which provides services to the economic base industries as well as the general public, and State and local government.
http://www.commerce.state.ak.us/dca/pub/AEPR2003.pdf

6.2.4.1 Oil and Gas

Alaska currently has two commercially active oil and gas regions; Cook Inlet and the North Slope. The North Slope, on the Alaska Arctic coast, is the largest operating oil field in the United States, having produced 13.7 billion barrels of oil since production began in the late 1970s, with an estimated 5.4 billion barrels of oil still in the ground. A number of other North Slope oil units have come on-line to supplement the Prudhoe Bay Unit's production that has declined significantly over the last 15 years. Total North Slope oil production is expected to level out at about one million barrels per day through 2010, assuming that annual investments in

exploration and extraction average $1.7 billion each year. The description of Alaska's current oil and gas industry economy is derived from the Alaska Economic Performance Report, 2003.

The oil and gas industry is the major employer and economic driver for the State, directly and indirectly employing 17 percent of the total wage and salary workforce. The oil and gas industry includes the exploration, development and production of oil and gas products. This does not include oil and gas field services and pipeline transportation. Employment in oil and gas extraction, pipelines and mining support was 9,855 in 2002, and compares with 9,823 total jobs in the oil and gas industry in 2001 reported under the old Standard Industry Classification scheme. Wages and salaries were $945 million in 2002, up from $910 million in 2001.

Three of Alaska's boroughs, Anchorage, the North Slope, and the Kenai Peninsula, account for over ninety percent of direct oil industry employment. Production facilities are based in the latter two while management headquarters are typically located in Anchorage. The North Slope has the largest concentration of oil industry workers. The oil industry accounts for nearly half of the North Slope's wage and salary employment. Alaska's mature oil province, the Kenai Peninsula, has the most diverse hydrocarbon industry in the State–oil and gas production, pipeline transportation, a liquid natural gas facility, an oil refinery, and a urea-ammonia fertilizer plant. These players represent ten percent of the Peninsula's wage and salary employment and 18 percent of the payroll. Most oil industry employment in Valdez and Fairbanks involves the transport of North Slope oil. Approximately 15 percent of Valdez's direct employment is tied to the TAPs. Although direct oil industry employment is relatively small, Fairbanks is a major logistic and supply center for the North Slope. Valdez and Fairbanks are also home to oil refineries.

Although most of the jobs in the oil industry are located in a limited number of geographic areas, the workforce is drawn from all around the State and nation. This is particularly true for the North Slope, where very few oil workers reside. For example, there are only a handful of oil industry jobs in the Mat-Su Valley, but three percent of the boroughs' labor force commute to the North Slope to work. Many residents of the Kenai Peninsula, which has the second highest concentration of oil industry related job, work in the oil industry elsewhere. According to the 2000 Census, 755 Kenai Peninsula residents worked on the North Slope, a figure exceeded only by Anchorage (1,541) and the Mat-Su Borough (813). Over the past decade, between 22 and 29 percent of Alaska's oil industry workers have been nonresidents. In places like Fairbanks, Anchorage, Valdez and Kenai, local residents make up a much larger percentage of the oil industry workforce. There is probably not an area in the State that does not send some of its workforce to Alaska's oil fields. (Fried, et al, 2003)

In addition to significant employment and earnings, the oil and gas industry generated almost $2.1 billion in revenues to the State of Alaska for FY 2003, up from $1.9 billion in FY 2002. This includes about $599 million in severance taxes, $840 million in royalties, $151 million in corporate income taxes, and $48.7 million in property taxes. Additionally, $403.8 million in royalties went into the Alaska Permanent Fund. State and some local government services are

greatly dependent on the oil industry. Oil revenues represent 84 percent of all State General Fund unrestricted revenues.

6.2.4.2 Minerals

The mining industry extracts such minerals as coal, gold, silver, platinum, copper, tin, lead, and other minerals from mines throughout Alaska. During 2003, metallic minerals accounted for nearly 91 percent of the total value of Alaska's nonfuel mineral production. The State continued to rank 12th among the 50 States in total nonfuel mineral production value and accounted for nearly three percent of the U.S. total. Based upon USGS estimates of the quantities produced in the 50 states during 2003, Alaska continued to rank first in the production of zinc and silver and second in lead; it also ranked second in the quantity of gold produced among ten gold-producing states. The total value of the Alaska mineral industry is expected to be approximately $1.40 billion for 2004, topping $1 billion for the ninth straight year. http://minerals.usgs.gov/minerals/pubs/state/2003/akstmyb03.pdf

Placer gold mines continue to contribute to the value of the industry. Production amounts to over 25,000 ounces per year from operations throughout the State. Hard rock development and mining continues to increase. Development stage projects include Pogo near Delta Junction, Kensington near Juneau, Rock Creek near Nome, and Nixon Fork near McGrath. Advanced stage exploration projects include the Donlin Creek project near Aniak, and the World Class Pebble Copper project located near Iliamna. Two large open pit metal, one moderate-sized open pit coal mine, and one large underground metal mine are operating in the State. The Teck-Cominco Red Dog zinc mine near Kotzebue is the most valued contributor with over one-half of the total value credited to this mine. Greens Creek near Juneau and Ft. Knox near Fairbanks round out the major metal producers in the State. Industrial minerals operation continue to provide the needed materials for construction of roads and other infrastructure.

Preliminary exploration expenditures in Alaska were more than $64 million, about a 240 percent increase from 2002 and 2003 values. Exploration occurred across Alaska, but $38 million (or 59 percent of the exploration funds) were spent in southwestern Alaska. Fifteen exploration projects had budgets greater than $1 million, including the Pebble copper-gold project in the southwestern Alaska coastal area. Development investment amounting to $165.6 million for 2004 showed a significant increase over 2003; the 2003 investment was $39.3 million. Significant investments included Greens Creek Mine and the Kensington Project, as well as in the sand and gravel industry. Development investment continued on the Kensington Project in anticipation of resolution of a permit appeal by the Southeast Alaska Conservation Council. Production values also increased significantly over the 2003 value. The increase was due to improved metal prices, which were significantly up over 2003, although production volumes were down.

A large majority of the value was the result of zinc, lead, and silver production (descending order of value) from the Red Dog Mine near Kotzebue in northwestern Alaska and the Greens Creek Mine in southeastern Alaska southwest of Juneau, gold production from the Kinross Gold Corp.'s Fort Knox Mine near Fairbanks in east-central Alaska and from the

Greens Creek Mine.

The mining industry has nearly tripled in wage and salary employment since 1980. Mining provided 1,503 jobs in 2002, with gold mining and zinc-lead extraction each accounting for 444 positions. Together, these two types of mining accounted for 59 percent of all mining employment. Silver mining was the next largest with 17.6 percent of the industry's workforce. Sand and gravel, coal, and a miscellaneous "other" category contributed the balance. Alaska's mining employees are some of the highest paid in the State. In 2002 they eared an average of $63,763 a year. Though less than the earnings of oil workers, that amount is substantially more than the statewide average of $37,101. Earnings in the mining industry are not only high, they have also risen faster than inflation in the period from 1980 to 2002. In constant 2002 dollars, earnings have increased from $57,450 in 1980 to $63,763 in 2002. (Alaska Economic Trends, December 2003) http://minerals.usgs.gov/minerals/pubs/state/2003/akstmyb03.pdf

6.2.4.3 Fisheries

6.2.4.3.1 Commercial

Alaska leads the nation in the value of its commercial fishing catch—chiefly salmon, crab, shrimp, halibut, herring, and cod. Anchorage and Dutch Harbor are major fishing ports, and the freezing and canning of fish dominates the food-processing industry, the State's largest manufacturing enterprise. Commercial fishing contributes about five percent of Alaska's economic base. http://www.akhistorycourse.org/articles/article.php?artID=262
While total commercial harvests have remained fairly constant in recent years, the value of the catch is declining, largely due to the salmon fishery, which competes with farmed salmon. Nonetheless, there is major growth potential for the economy, as many important components of the industry could be relocated to Alaska where the bulk of the resource is harvested.

Commercial harvest of fish and shellfish in the waters off Alaska in 2004 are estimated at 5.4 billion pounds with an exvessel value of at least $1.2 billion. Preliminary exvessel values of the fisheries in 2004 were $236 million for salmon, $565 million for groundfish, $15 million for herring, $195 million for halibut, and $155 million for shellfish. (Division of Commercial Fisheries 2005 Overview) In 2002, exports of Alaska seafood contributed $2.5 billion to the U.S. balance of trade. Fifty-four percent of U.S. commercial seafood harvest by weight came from Alaska in 2002.

In terms of the value harvested in 2002, Alaska had two of the country's five top fishing ports. Dutch Harbor (in Unalaska) and Kodiak produced $136 million and $63.3 million in ex-vessel value, respectively. Alaska has 12 of the nation's top 93 fishing ports. Dutch Harbor may be Alaska's busiest port; however residents from Kodiak Island earn more from fishing than residents of any other region of Alaska.

Employment and Earnings

Commercial fishing (including processing) employs more people than any other private basic sector, directly supporting nearly 20,000 jobs and indirectly about 14,000 more. In 2002, the estimated number of resident and non-resident people directly participating in fisheries in Alaska and adjacent Exclusive Economic Zone waters was 22,900, down from 25,300 in 2001. This includes fishermen, crew and processing workers. Processing employment is provided as full time equivalent jobs. Personal income in 2002 of residents engaged in fishing and seafood processing is estimated at $139 million, down from $156 million in 2001.

The Alaska Commercial Fisheries Entry Commission (CFEC) issued 24,257 commercial fishing entry permits to 14,934 permit holders in 2002. The number of permit holders that fished in 2002 was 9,441, 73 percent of which were Alaska residents. While residents hold 73 percent of permits, they earn only 35 percent of the gross earnings. Crew permits were substantially down from 11,747 in 2001. CFEC permits are required for salmon, herring, crab and other fisheries under Alaska management authority.

There were 1,376 vessels operating in the 2001 groundfish industry, a decrease of nine percent from 2000. The average crew wage aboard a trawl catcher vessel targeting pollock ranged from $169,000 to $239,000. The groundfish industry includes pollock, Pacific cod, sablefish and many other species.

The Alaska Department of Labor and Workforce Development reported the seafood processing sector makes up 71 percent of the manufacturing sector in Alaska. Of the 7,406 people employed in Alaska's on-shore seafood processing sector, approximately 69.6 percent (5,200) were non-residents. Alaska residents working in the processing sector earned an average of $28,500 per full-time equivalent job, for a total of $148 million in wages. Six seafood processors are listed among the top 50 employers in Alaska for 2002. In 2000, there were 105 offshore groundfish processing operations, including floaters, motherships and catcher processors. Approximately half of these operations were covered by CFEC permit requirements. The other half comprises large factory trawlers employing 3,437 full time equivalent crew and processing workers with $261 million in total earnings. Total at-sea processor crew weeks increased from 98,933 weeks to 110,197 weeks (+11 percent). Gross product values of Alaska groundfish processors increased five percent from 2000 to 2001.

Salmon Issues

In 2003, commercial harvests of salmon in 2003 improved over the previous year's harvest but exvessel value and participation levels remained low. The 2003 Pacific salmon catch of 177 million fish, the 6th highest catch in the last 125 years, exceeded the forecasted harvest of 150.9 million fish. The exvessel value of $195 million was the 4th lowest since 1976 and was about 75 percent of the recent 5 year average of $258 million. The Bristol Bay sockeye salmon harvest of 14.9 million fish was the best in the last five years but was still well below the 20-year average of 24.7 million fish. Record high harvests were recorded for Lower Cook Inlet sockeye salmon (644 thousand fish) and Prince William Sound pink salmon (51.1 million fish). The Yukon River chinook salmon harvest was the highest since 1977, and the Yukon coho salmon harvest was more than 1.5 times the previous record set in 1994. In contrast, harvests and

participation in Norton Sound and Kotzebue area commercial fisheries continued at levels near the lowest recorded for those areas.

A significant weakness in the Pacific salmon industry has impacted the economy. Since 1993, Pacific salmon has been in general decline (with the exception of 1999). The loss of income from salmon has devastated many local economies – especially in western Alaska. Fisheries-related jobs provide for about 74 percent of the wages from economic activity in Western Alaska. This area is responsible for up to half of the world's sockeye salmon harvest in some years. Very few economic opportunities exist in these remote regions to offset salmon losses. Worldwide production of farmed salmon and an oversupply of wild salmon from other countries including Chile, Norway, and British Columbia are outpacing the demand for Alaska wild salmon. Until balance between supply and demand is achieved, Pacific salmon fishermen and processors will face an uncertain future at best.

6.2.4.3.2 Sports Fishing

A study conducted in 1999 for the ADFG (Haley, et al, 1999), examined the economic significance of sports fishing in Alaska based on 1993 data. Spending by sport anglers was divided among four regions: south-central (Kenai Peninsula, Anchorage area, Mat-Su area north), southeast, northern, and southwest. Nearly two-thirds of all spending was in south-central Alaska, with resident spending in that region twice as much as visitor spending. Close to 20 percent of spending was in the southeast, and there, visitor spending was slightly higher than resident spending. In the northern region, almost all of the ten percent of spending was by residents, and most of the eight percent in the southwest was by visitors. According to the study findings, both visitors and residents cited selecting fishing sites based on their likelihood of catching fish as the primary reason for visiting a particular area. However, residents also stated less expensive sites with road access played a factor, while visitors looked for scenic areas.

Sports anglers spent an estimated total of $540 million for sport fishing in 1993; $341 by residents and $199 million by visitors. For residents, the biggest expense (48 percent) was the share of vehicle costs, followed by expenses for specific trips (26 percent), and then fishing gear and equipment (15 percent). The largest share of visitor expense was for fishing trips (41 percent), which include costs of guides and charters. The next biggest expense (38 percent) was money they spent during fishing trips but which was not specifically for fishing, e.g., for a place to stay. Package tour costs, which typically include costs of fishing, lodging, transportation and eating, made up about 14 percent of visitor spending.

That spending directly created jobs and payroll in Alaska: an estimated 6,635 jobs and $142 million in payroll in 1993. In turn, this spending created more jobs and payroll as it circulated through the economy: an additional 2,600 jobs and $67 million in payroll. The study estimated that the total economic significance of sport fishing in 1993 was 9,236 jobs, $209 million in payroll, and $637 million in sales.

In *The National Survey of Fishing, Hunting, and Wildlife* (2001) conducted by the

USFWS, it was estimated that US residents spent $537 million on fishing trips and equipment in Alaska. This is money that was spent in Alaska and only includes U.S. residents, even though Alaska draws anglers from all over the world. The American Sportfishing Association used the National Survey information to estimate that the expenditure for sport fishing in Alaska in 2001 generated 11,064 jobs, $238 million in wages and salaries. These jobs and income rippled through the economy to generate an estimated total of $960 million in spending. (http://www.sf.adfg.state.ak.us/statewide/SFeconomics.cfm; last viewed 9/24/04)

6.2.4.3.3 Subsistence Fishing

According to the ADFG's 2002 Annual Report on Alaska Subsistence Fisheries (the most recent report available), subsistence fisheries contribute about 62 percent; 60 percent from finfish and two percent from shellfish. On average, this subsistence fisheries harvest provides about 230 pounds of food per person per year in rural Alaska. Although producing a major portion of the food supply, subsistence harvests represent just a small part of the annual harvest of wild resources in Alaska, about two percent. Commercial fisheries take 97 percent of the wild resource harvest and sport fisheries and hunts take about one percent.

In a 2001 study entitled *The Economic Importance of Healthy Alaska Ecosystems*, the author Steve Colt demonstrates how difficult it is to calculate the net economic value of Alaska's subsistence fisheries. In addition to considering the value per pound of replacement of subsistence foods, one has to take into consideration the value of labor input, value of gear purchased to acquire the fish, travel cost or "contingent valuation," as well as cultural and social value of the subsistence experience.

6.2.4.4 Timber

In 2002, Alaska's public lands timber harvest was approximately 70 million board feet (mmbf). Coupled with an approximate 260 mmbf harvest of private Native Corporation lands, the total harvest to roughly 330 mmbf. In the calendar year 2002, the wood products industry (including forestry services) employed an annual average of 983 workers, peaking at about 1,200 jobs in August — the height of the logging season. Employment is down 23 percent from the previous year, following a downward trend since 1999. Wood products manufacturing employed approximately 321, or one-third of that total, and offered more seasonably-stable employment. Industry-wide earnings totaled $37.9 million in 2002, and average monthly individual earnings were $3,490. Logging accounted for $26.5 million of earnings, and manufacturing, $9.9 million. In the calendar year 2002, the total value of wood products exported from Alaska was $146.2 million, including $136 million in softwood logs, $9.5 million in chips, and $700,000 in lumber. The total value decreased 26 percent from the previous year's total of $196.6 million. Japan remains the dominant export market, accounting for 58 percent of total wood product exports in 2001. However, because of the long term stagnation of Japan's economy, Alaska exporters have had to look to other markets. Traditionally, Japan has purchased nearly 80 percent of Alaska's total wood products exports. In 2001, Korea and Canada purchased approximately 20 percent and 15 percent respectively. China (four percent) and Taiwan (two percent) were the other two significant export markets.

Average annual employment in Alaska's logging, lumber, and pulp industries has fluctuated between 2,000 and 4,000 over the past four decades. Employment peaked in 1990 at just under 4,000, constituting 1.4 percent of total Alaska employment in that year. By 2002, average annual employment by logging companies, sawmills, and pulp mills declined to approximately 800. In the 1990s, the structure of the forest products industry in the coastal forest of Southeast Alaska was fundamentally altered by (1) the closure of major wood products processing facilities in Sitka and Ketchikan, resulting in a major decline in production and jobs; and (2) the depletion of Native corporation sawtimber inventories. Harvest of National Forest timber in Alaska declined by nearly 80 percent. An economic downturn in Japan, Alaska's principal export market, competition for the Japanese market from European and Canadian producers, and high transportation costs have also contributed to a precipitous decline in timber harvests from national forests in Alaska, from 742 mmbf in 1990 to 44 mmbf in 2001. Similarly, although markets are smaller, there have been significant decreases in exports to South Korea (44 percent) and China (90 percent) over the same period. Reorganization of the forest processing industry supplied by timber from the Tongass National Forest following closure of the two pulp mills has created room for potential new manufacturing facilities. However, whatever the short-term changes in markets and policies, forest products industry employment and income derived from forest products are unlikely to achieve the 1990 level again in the next several decades. (Brooks, et.al, 1997) Revised projections for demand for Alaska National Forest timber between 1998 and 2007 range from 113 to 156 mmbf.

On the Kenai Peninsula, private and public landowners have greatly increased the harvest of timber to deal with the devastating spruce bark beetle infestation. Public and private landowners in the area are striving to reduce fire loads, create defensible space for communities, and salvage resource value to invest in replanting. While this has accelerated local wood product activity, the overwhelming majority of these trees have been chipped and exported. Little of the harvest has been suitable for value-added products. The only area in Alaska with growing employment in the wood products industry is in the Tanana Valley of the interior, where mills are primarily producing lumber and custom log cabins for local markets.

Positive developments are taking place. The Alaska Wood Technology Center in Ketchikan is currently testing the strength characteristics of Alaska tree species in order to establish Alaska specific lumber grades. The new grades should increase the value of Alaska lumber and standing timber. A group of investors is trying to restart the veneer mill in Ketchikan. If functional, the mill would use lower grade hemlock and spruce. While the Tongass Land Use Management Plan (TLMP) reduced annual allowable harvest levels to 150 mmbf, the Forest Service is replacing more expensive uncut timber sales with more economical sales with up to 10-year terms. The State of Alaska is advocating for a new 1.7 million acre State Forest from the existing Tongass National Forest. This is equivalent to the commercial forestland base that is available for harvest under the 1997 Tongass Land Management Plan. There are promising niche markets in Japan for Alaskan softwood lumber. The unique characteristics of Alaskan softwood species are well suited to the demands for Japanese post and beam products. Sitka spruce and Alaska yellow cedar continue to enjoy a good reputation in Japan. In addition, a growing number of builders are decreasing their use of engineered wood products to address

new requirements in Alaska's Housing Quality Assurance Act of 2000 and "sick house syndrome" concerns. Alaskan sawmills have a unique opportunity to increase their sales of Alaska yellow cedar lumber in both the post and beam as well as the 2x4 segments of the home building industry.

In addition to the direct use of forest for lumber, is important to remember that forest ecosystems play an important role in Alaska's economy through indirect ecosystem functions and values. Some examples of ecosystem services include: (1) purification of air and water; (2) mitigation of droughts and floods; (3) generation and preservation of soils and renewal of their fertility; (4) cycling and movement of nutrients; (5) protection of coastal shores from erosion by waves; and (6) partial stabilization of climate. Alaska forests contribute ecosystem services especially important to the economy through support of subsistence activities; commercial fisheries, sport hunting and fishing, and values of non-consumptive uses of the forest involving tourism, recreation, and enhancement of the quality of life. Most anadromous fish harvested in Alaska waters spawn and rear in freshwater streams whose water quality and quantity is regulated by forest lands. Many of the big game animals most important to hunters depend on forest ecosystems, including Sitka deer, moose, black bear, and coastal brown bear. In addition, caribou and mountain goats utilize interior and coastal forests, respectively, for winter range. The most important furbearing mammals are forest residents, thereby making the forest ecosystems a critical element of supporting subsistence and sport hunting and trapping activities. Forests create specific scenic resources for major segments of the tour industry, including cruise ships and State ferry routes up the Inside Passage in southeast Alaska and in Prince William Sound. Over one million nonresident tourists visit Alaska annually, and this number continues to grow rapidly. Alaska forests also benefit people outside Alaska by helping to regulate global climate, trap atmospheric carbon, and filter air pollutants. (Brooks, et.al., 1997)

6.2.4.5 Tourism/Recreation

Tourism is the only private sector industry in Alaska that has grown continuously since statehood. From October 2002 through September 2003, over 1.56 million tourists visited Alaska, up 2.2 percent from 1.53 million the previous year. This represents a 62 percent increase in visitor arrivals over 1994, with an average annual growth rate of 3.7 percent over the last decade. The highest growth rate during that period has been in cruise ship travel, with an average annual growth rate of 9.2 percent. Domestic and international air arrivals have increased annually by 2.3 percent and 6.4 percent, respectively. While motorcoach arrivals have nearly doubled in the last decade (8.9 percent per year), the number of people entering Alaska by personal vehicles is one-third lower than it was ten years ago. Not surprisingly, 84 percent of 2002/2003 visitors (1.28 million) came during the summer 2003 season, from May to September.

Economic Contribution

Residents and non-residents spent $2.4 billion on travel and tourism in Alaska in 2002. The economic contribution to Alaska (the dollars retained in Alaska) was $1.5 billion. The total economic contribution includes both the direct and indirect economic impact of all tourism spending. A new economic model called the Alaska Tourism Satellite Account (ATSA) has been

developed to connect travel and tourism sales to all associated industries in Alaska that produce travel-related goods and services. This approach allows the State to trace economic contributions industry by industry.

Under the ATSA model, travel and tourism sales include spending by resident and non-resident travelers, plus other government and private expenditures for marketing and capital improvements. This approach provides all spending in the Alaska travel and tourism economy. It is important to understand that not everything purchased for Alaska travel and tourism is produced in the State. Therefore, the economic contribution to Alaska is somewhat less than total spending and is net of imports. The core travel and tourism industry are businesses that deal directly with end users. The core travel and tourism industry generated $851 million in value added in 2002, or three percent of Gross State Product. Value added is the sum of wages and salaries, corporate profits, and indirect business taxes. In terms of employment, the significance of travel and tourism is much greater. The core tourism industry represented almost 26,000 jobs in 2002. The ATSA measurement system ranks travel and tourism as the fourth largest employer in Alaska – accounting for 9.1 percent of the workforce. This approach measures tourism on the same basis as other industries. Under previously-used models, the tourism industry in Alaska was ranked as the second largest private sector employer and the third largest revenue producer for the State of Alaska, after the oil and gas and commercial fishing industries.

Industry Issues and Outlook

Virtually all of the growth between 2001 and 2002 in visitor arrivals was attributable to the cruise sector that experienced a growth rate of 6.9 percent. According to the Northwest Cruiseship Association, the cruise ship industry generated $809 million in direct purchases ($605 million) and to Alaskan wages ($204 million), supported 16,455 Alaskan jobs, spent more than $70 million to market the State, and contributed two million dollars annually to Alaska nonprofit organizations. In 2003, passenger arrivals via cruiseship was 776,000, in 2004 807,040 (an estimated four percent increase). (Juneau Convention and Visitors Bureau) There were 2.6 million passenger visits to Alaska cities, with an expenditure of $250 million (an average of $100 per visit). In addition there were approximately 1.1 million crew visits with approximately $18 million in expenditures (an average of $17 per visit). Tourism is the second largest industry in Alaska with cruise tour operators generating thousands of jobs across the State. In addition to employing Alaskans, cruise companies work with approximately 1,700 Alaskan-owned businesses. Cruise berth capacity for the industry is projected to grow at an annual rate of five percent or more for the next two to three years.

The only other mode of travel that increased was international air, with domestic air arrivals remaining relatively steady. Highway and ferry arrival numbers continued to decline. Some net additional growth in cruise traffic is expected over the next few years as cruise lines increase their capacity in the market. With over 60 percent of out-of-state visitors arriving and leaving Alaska by air, and many more using air to get to cruises, this may prove to be a smart investment as hopes for the airline industry increase.

Recreation among Alaskans (excluding sport hunting and fishing) supports close to 10,000 Alaska jobs and produces about $240 million in annual income. About half those recreation jobs depend on wildlife viewing and the other half on hiking, camping, skiing and other outdoor recreation activities. No systematic data is collected on these activities, but the limited data available suggest that it is up sharply in the past decade. (Colt, 2001)

Based on a study by J.M. Bowker (Outdoor Recreation Participation by Alaskans, Projections 2000-2020) among Alaskans, the five recreational activities with the highest participation per capita are bird/wildlife viewing, scenic driving, offroad driving, biking, and fishing. There are almost 13 million annual occurrences of scenic driving and bird/wildlife and over seven million annual fishing experiences. Projected increases in participants, times, and primary purpose trips for most activities can be expected to keep pace with population growth at roughly 28 percent. On a percentage basis, the fastest growing activities are adventure activities, backpacking, biking, berry picking, and tent camping. Nevertheless, the five activities which show the greatest growth in the absolute number of times Alaskans participate in them are scenic driving, biking, bird/wildlife viewing, RV camping, and fishing. The increases in these activities range from over four million times in scenic driving to an increase of more than 1.6 million times in fishing. Hiking, with an increase of close to 1.5 million times barely misses being included among the five activities in terms of expected increases. Such findings make it clear that roads and water ways will continue to be heavily relied upon for outdoor recreation.

Among nonresidents coming to the State for wildlife-related recreation, this study finds that growth in participants should increase for fishing, wildlife viewing, and hunting for relatively large percentages. By 2020 the number of bird/wildlife viewing tourists is expected to be over one million, based on an increase of 546,000 participants over the next 20 years. This forecast suggests that for bird/wildlife viewing, tourists will outnumber Alaskans by more than ten to one by 2020. While not as dramatic, the growth of tourist anglers is also expected to exceed that for in-state anglers by 50 percent. By 2020, the ratio of Alaskan to tourist anglers should be close to one-to-one. Nonresident hunters are expected to double by 2020, however, in absolute terms, the increase of 17 thousand hunters in small compared to those for fishing and wildlife viewing.

6.2.4.6 Construction

Historically, construction in Alaska has been characterized by boom and bust cycles, driven by the construction of military projects, refineries, oils pipelines, oil field developments, and other large infrastructures projects. The last construction boom the State experienced was in the early 1980s based on increased oil revenue and a growing population, along with other factors. This was followed by an economic bust with the loss of more than 8,500 construction jobs between 1985 and 1988. However, construction employment began to recover in 1989 and has been gaining incrementally since 1989. Over the past decade, it grew by more than four percent a year. Although the industry has made a steady recovery, it still does not approach the employment peaks of 30,000 established in 1976 or 20,700 reached in 1983. By the end of the construction bust of the late 1980s, construction's share of all wage and salary employment had fallen to a low of four percent. Since that time the industry's share has grown slightly and it now

employs five percent of the wage and salary workforce. It appears unlikely that the construction industry's share of the workforce will regain the high levels of the past.

Construction in Alaska is divided between private and public expenditure. Private construction is defined as oil and gas, mining, residential and commercial construction, hospitals, utilities, and other basic industries. Public construction is defined as defense, highways, airport and water transport, Alaska Railroad, Denali Commission, education, and other federal, State and local. Estimated total construction spending in Alaska in 2005 is expected to be $5.94 billion, with $3.835 billion provided by private funds and $2.105 from public sources. The following discussion is drawn from the "2005 Alaska Construction Spending Forecast by Scott Goldsmith and Mary Killorin, published in January, 2005.

Private Construction

Anticipated oil and gas industry spending in 2005 will be $1,835 million due to an increase in investment by the BP, Conoco, Phillips and Exxon and the independent companies on the North Slope as well as the start of the Alyeska reconfiguration project and a refinery upgrade in Fairbanks. The major companies anticipate investing $1.9 billion in their Alaska operations in 2005. Backing out the purchase of tankers and expenditures related to the Alyeska pipeline, the total construction budget for optimizing production from existing fields, including new wells and facilities to handle water and gas produced with oil, and for exploration will be $1.4 billion. The independents on the North Slope, including Kerr McGee, Pioneer, and Armstrong will spend about $85 million on exploration. In Cook Inlet, exploration and development spending by Unocal, Aurora, Marathon, Forest, Pelican Hill, North Star Energy Group and others will increase this year to an estimated $155 million. A two-year project to reconfigure the Alyeska pipeline will begin in 2005 . In addition, the Flint Hills refinery will begin a two year project to upgrade their refinery in Fairbanks. Approximately $175 million in spending in 2005 is associated with these projects. The oil and gas spending level in 2006 and beyond will depend largely on whether any new fields, such as Liberty, move into the development stage.

In 2005, it is estimated that the mining industry will spend approximately $300 million on construction. In general, spending by the mining industry on exploration, development and construction of new mines, as well as upgrading existing mines, will increase in 2005. The development of several important prospects, including Donlin Creek and Pebble, bodes well for a continuation of strength in this sector in future years although the construction spending currently associated with those prospects is small. The Pogo mine, outside Fairbanks, is in its second year of construction and should be completed in 2005 with expenditures expected to be about $120 million. Construction of the Kensington Mine in southeast Alaska was scheduled to begin in 2004, however it was postponed and construction startup is included in the forecast for 2005. A budget of $70 million for the first year of construction is expected. The smaller Rock Creek project at Nome will also be under construction in 2005 with a budget expected to be about $40 million. Significant upgrades are expected at some of the existing large mines around the State, in particular at Red Dog and Fort Knox. Smaller capital budgets are expected at True North, Greens Creek, and Usibelli bringing the total to about $40 million. Normal operations at these and the smaller mines and prospects throughout the State also require annual construction

spending for maintenance, repair, and upgrading of facilities.

Approximately $50 million is associated with construction projects in other private industries. There are no reported large construction projects announced for the seafood, timber, and manufacturing sectors this year. The tourism industry is adding limited additional facilities outside the major metropolitan areas this year. For example, the Denali Wilderness lodge will be expanded. On the down side, the planning for a large private cruise ship dock for Ketchikan has not moved forward this past year.

The residential construction industry is expected to generate $700 million in 2005; approximately the same as in 2004. Commercial construction spending consisting mainly of retail, office, hotel, and warehouse space, is expected to be around $250 million. There are no giant projects that have been announced for this sector (with the possible exception of a new parking garage at Ted Stevens International Airport) which generally consists of numerous smaller buildings, many of which are not well publicized prior to actual construction. Because of this, it is impossible to develop a complete listing for each community. Vacancy rates overall were generally a little higher moving into 2005, and interest rates have been rising. Thus, the total volume of new square footage may be down slightly, although higher construction costs will keep the value of construction at about the same level as last year. Additional retail space will continue to be the most important category for the Matanuska-Susitna Borough. As with residential construction, Fairbanks should see another strong year in response to economic growth from mining and the military. Hospital construction is expected to add another $350 million to the commercial construction figure. It will be dominated by expansion of Providence Hospital in Anchorage at a cost of $110 million, and completion of the hospital in Mat-Su ($75 million). Expansions of hospitals in Fairbanks, Juneau, and on the Kenai Peninsula will add another $125 million. Projects at other smaller facilities around the State will further increase the total for this sector.

All together, utilities construction will total about $350 million. The communications sector will continue to be a dynamic sector with about $110 million of new investments. No large private transportation construction projects have been identified for this year. The electric utilities may spend $200 million on generation, transmission, and distribution projects throughout the State. The largest single project is a new generation plant in Fairbanks, estimated to cost $90 million. Gas distribution company investments will be about $10 million.

Public Construction

Most public construction money comes from the Federal government with smaller amounts from State and local sources financed by current revenues and bonds. For several years, construction spending for defense has been twice the long term Alaska average. A number of big ticket items will continue to boost public construction in 2005, some of which were postponed from last year. The most significant is the continued buildup associated with the deployment of the new Stryker Brigade to Fort Wainwright at Fairbanks. Construction will be underway to prepare for the full force, much of which will temporarily be housed at Fort Richardson in Anchorage. Considerable construction activity is also associated with the mobilization of a new

airborne brigade combat team and a C-17 cargo plane squadron. Both of these deployments will be in Anchorage. Spending on the missile defense system at Fort Greeley and other sites will continue this year with the deployment of ten additional missiles. After this year, defense construction spending may begin to taper off back down to levels more consistent with the late 1990s.

In transportation, the federal highway budget in Alaska has been trending upward, and spending should be higher in 2005 because of the replacement of some funding that was lost in 2004. The 2005 $400 million budget funds highway construction throughout the State, with the largest projects typically located in the Anchorage area and along the rest of the railbelt. About $230 million from the Federal Aviation Administration will go to fund airport construction projects in the $5 to $10 million range throughout the State. Activity at Ted Stevens International Airport in Anchorage has been winding down with the completion of Concourse C, but this year will see spending on the refurbishing of Concourse B as well as a normal level of spending on runway enhancements, and other projects totaling about $40 million. Port and ferry dock spending from the Economic Development Administration and other sources will add another $60 million. A large project on the horizon is a major expansion of the Anchorage port. The Alaska Railroad's construction spending will increase modestly this year for a total of $75 million, as the railroad works to continue to improve the quality of the operation and keep transportation costs along the railbelt as low as possible. Important projects include track improvements, completion of the new operations center in Anchorage, and rail yard expansion. Preliminary design work for extension of the railroad to Fort Greeley will also be underway.

Other federal agency capital for construction spending in 2005 will add another $300 million to Alaska's economy. Federal agencies other than the Department of Defense, such as DOI, NPS, USFWS, BLM, Postal Service, Department of Agriculture, and others have their own capital budgets. For example, the NPS is building new facilities in some of the National Parks in the summer of 2005. Most of the State capital budget is funded by federal grants. Excluding transportation projects, the largest category is rural sanitation projects, based on grants from the Indian Health Service, Housing and Urban Development, EPA, and other federal agencies. This initiative will be contributing $100 million to State construction spending, about the same amount as in past years. The Federal government also provides grants and other construction funding to Alaska tribes and non-profit organizations across the State. The most important recipients of these grants are Native nonprofit corporations, housing authorities, and health care providers. The largest single program is the Native American Housing and Self-Determination Act Program (1996), which provides funds for housing construction in Native communities through a large number of Native housing authorities throughout the State.

Construction spending for schools will be $150 million in 2005, down from 2004 due to the completion of a large number of projects funded by an earlier State bond issue. Current projects are largely funded by local bond issues that were passed before the expiration date for inclusion in the State bond reimbursement program at the end of 2004. More limited funding is coming from the State general fund capital budget. One large project on the horizon for Anchorage is the new Muldoon middle school with a projected cost of $50 million. Other projects are much smaller, with many renovations and repairs scheduled. Two large University

of Alaska construction projects were completed in 2004—the library in Anchorage and the museum in Fairbanks, and the next large project, the Integrated Science Center in Anchorage, has not yet gotten underway.

Other State and local expenditures for will add approximately $150 million for non-education construction projects such as roads, drainage, trails, parks, and police and fire stations. For example, Anchorage expects to spend about $50 million on such projects. Local government enterprises not included in other categories, such as Anchorage Water and Wastewater, which has a $40 million capital budget this year, are another component of this residual category. A small amount of State-funded construction spending that is neither based on federal grants nor related to transportation or education also falls into this category. An example is grants from the State to local governments, for facilities construction and maintenance.

6.2.4.7 Transportation

Alaska's mountain ranges, glaciers, and vast wilderness create natural barriers to transportation. Transportation plays a much larger role in Alaska's economy than in much of the rest of the nation. Identified statewide transportation needs approach $7.5 billion dollars, and no other State relies as heavily on federal funds to help meet its transportation infrastructure needs. The State's proposed FY 2005 capital budget includes more than $977 million in federal transportation funds. Federal funding for road, highway, and ferry projects totals $409 million, with another $168 million for airport improvement projects in Alaska.

6.2.4.7.1 Roads

The only road into the State is the Alaska Highway, built as a military supply route in 1942 and extending from Dawson Creek, British Columbia, to Delta Junction south of Fairbanks, a distance of 2,288 km (1,422 mi). Another major land route, entirely within Alaska, is the Richardson Highway, about 590 km (about 370 mi), which connects Valdez with Fairbanks. In 2003 the State had 22,901 km (14,230 mi) of highways, including 1,741 km (1,082 mi) of the federal highway system. Highways in Alaska, with the exception of the Dalton Highway, are typically asphalt-paved two-lane roads. In a populated center such as Fairbanks, more than two lanes may exist. Today, 1,487 miles (73 percent) of National Highway System roads in Alaska meet federal standards. The statewide highway budget in FY 2005 is approximately $410 million, and targets extensive projects from reconstructing roads and replacing bridge replacements to trail safety marking.

Except near Valdez and Fairbanks, traffic congestion is not a problem, although road maintenance activities may cause traffic delays. Annual average daily traffic counts along the Richardson Highway vary significantly between Valdez and Fairbanks from approximately 300 to 22,400 vehicles per day, depending on location. Traffic during the summer can be double the annual averages and is typically higher near the communities of Valdez, Glenallen, Delta Junction, and Fairbanks. (BLM, 2002) Even though Alaska has vast distances, they are generally not connected by roads.

6.2.4.7.2 Railroads

Mining encouraged some railroad development in Alaska, including a line from Skagway to the Canadian Yukon goldfields and a line from the copper mines to Cordova. The Alaska Railroad, the only major line, was begun in 1914 and completed in 1923. It travels a 535 mile route from Seward on the Kenai Peninsula via Anchorage to Fairbanks in the north. A spur connects Whittier to the main line near Anchorage. Dock and handling yards are maintained by the railroad at the ports of Anchorage, Seward, and Whittier for handling freight reaching Alaska by barge. The Alaska Rail Marine, managed by the railroad, operates rail-equipped barges year-round that transport freight between Seattle and Whittier. The railroad hauls more than seven million tons of freight and carries more than 500,000 passengers a year. Nonmetallic minerals account for 48 of the tonnage of goods hauled by rail, while petroleum products constitute 32 percent and coal 15 percent. In 1985 the State of Alaska purchased the Alaska Railroad from the Federal government and now operates it as a State-owned corporation. The White Pass and Yukon Railroad, from Skagway to Whitehorse, has been redeveloped as a popular summer tourist attraction.("Alaska," Microsoft Encarta Online Encyclopedia 2005 http://encarta.msn.com 1997-2005 Microsoft Corporation.)

6.2.4.7.3 Airports

Aviation is critical to the movement of goods and people in Alaska because of the distances between cities and much of the State's lack of a significant highway and railroad infrastructure. As of 2002, Alaska had 24 airports in 2002, with nearly all of them small airstrips. Alaska has approximately nine times the number of airports, ten times the number of registered general aviation aircraft, and 5.9 times the number of Federal Aviation Administration-licensed pilots per 100,000 residents, as the rest of the U.S. Many charter and air taxi operations and several Alaska-based airlines operate within the State. Anchorage is the State's largest hub for passenger and cargo traffic, followed in importance by Fairbanks. Lake Hood in Anchorage is the world's largest and busiest seaplane base. Daily service is provided by major U.S. domestic airlines both to the contiguous 48 states and international destinations. In addition, Anchorage and Fairbanks have become important air-cargo transfer centers for goods to and from Asia.

Air transportation accounts for half of all transportation employment in Alaska, compared with less than one-third nationally. In Anchorage, one in 10 residents works in an airport-related job. There are over 1,100 airstrips and airports in Alaska, almost 10,000 registered aircraft, and as many pilots. The State owns or operates 171 gravel-surfaced airports, 43 paved airports and numerous seaplane bases. Municipalities own or operate another 20 airports. Ted Stevens Anchorage International, Fairbanks International, Juneau International, and Ketchikan International airports account for most air activity occurring throughout the State. The majority of funding for these and other airport facilities comes from the Federal Aviation Administration through the State Department of Transportation and Public Facilities' Airport Improvement Program, and in 2004 totaled $168 million. Airport planners expect Anchorage's air cargo to continue to expand an average of five percent annually over the next five years.

6.2.4.7.4 Marine Transportation Systems

Alaska's major ports include Anchorage, Valdez, King Cove, and Kodiak. Three quarters of the total consumer goods in Alaska come through Anchorage's port. Anchorage is the largest port in the State and the 16th largest port in the United State. The port stages 100 percent of the exports of refined petroleum products from the State's largest refinery in Fairbanks and facilitates petroleum deliveries from refiners on the Kenai Peninsula and in Valdez. The total tonnage of goods in 2004 that came into the port of Anchorage was 4,628,009. That tonnage breaks down into 112,855 tons of cement, 1,760,935 tons in vans, flats and containers, 1,520,157 tons of rail petrol, and 1,216,896 tons of bulk petrol. (www.muni.org/port/index.cfm)

Valdez is the leading port in Alaska in terms of tonnage. Oil is the major commodity in Valdez. As of June 2005, holding tanks topped out at 5.5 million barrels (www.tax.state.ak.us/programs/oil/production/index.asp). Tourism is also an important industry for Valdez. During the summer of 1993, Valdez hosted 124,300 visitors. Twenty-two percent arrived via cruise ships, while 43 percent used a combination of the State highway and ferry system. King Cove's primary product is fish; it serves as one of the largest fish processing centers in the United States. Kodiak harbor is home to Alaska's largest commercial fishing fleet. Dutch Harbor/Unalaska's primary industry is also commercial fishing and seafood. Nome is the principal port on the Bering Sea, but is open for only a short period during the ice-free summer weeks. In summer large cargoes are often towed on barges to Prudhoe Bay.

Several of Alaska's other ports and harbors also experience a great deal of tourism during the summer months. Seward serves as the principal port on the Kenai Peninsula for tourism. Cordova, Homer, and Whittier also experience tourism in the summer. Data for the summer of 1993 show that Cordova received 17,200 visitors and Whittier received 83,600. The majority of visitors to southeast Alaska, 53 percent according to the Alaska Visitor Statistics Program data for 1993, arrive by cruise ship or smaller touring vessels. Larger cruise ships generally visit Ketchikan, Juneau, Skagway, Glacier Bay and Sitka. Smaller tour vessels tend to also visit the smaller ports, including Petersburg and Wrangell and may include more visits to natural attractions such as scenic fjord and allow more time for wildlife observation. (www.dced.state.ak.us/oed/toubus/pub/0-COMPLETE_BOOK.pdf).

A State-operated ferry system called the Alaska Marine Highway System serves Alaskan communities by transporting passengers and vehicles between coastal communities. The Alaska Marine Highway System provides year-round scheduled ferry service throughout southeast and southwest Alaska, extending south to Prince Rupert, British Columbia and Bellingham, Washington. The system connects communities with each other, with regional centers, and with the continental road system. It is an integral part of Alaska's highway system, reaching many communities that would otherwise be effectively cut off from the rest of the State and nation. The AMHS also provides a coastal transportation alternative between Anchorage and the "Lower 48" states versus driving the Alaska Highway.("Alaska," Microsoft Encarta Online Encyclopedia 2005 http://encarta.msn.com 1997-2005 Microsoft Corporation.)

6.2.5 Employment

Alaska's current employment statistics are provided in the February 2005 "Alaska Economic Trends" which is published by the Alaska Department of Labor and Workforce Development. Sectors of the economic base that are growing include mining, non-resident tourism and civilian federal government. Oil and gas production still dominates the economic base, but is decreasing in importance. The economy is growing most rapidly in the private support sector. This growth is primarily the result of growth in annual Permanent Fund Dividends, Native Corporation business activity and spending on capital improvement projects (2002 AK Economic Performance Report). Retail trade and service in the private support sector now exceed oil and gas by six percent. In the government sector, State spending has been decreasing, while local government spending has been increasing.

As of February 2005, employment in Alaska had completed its seventeenth year of nonstop growth, albeit, its weakest growth overall. Since 2000, the employment growth rate has been running at approximately 1.7 percent per year. Preliminary 2004 statewide employment figures showed a growth rate of 1.2 percent, compared to the 1.5 percent of 2003. Most of the major industry categories in 2004 showed little change from 2003 employment levels. For the first time since 2001, oil industry employment gained ground. Manufacturing employment levels moved upward for the second year in a row, after having lost ground during nearly all the previous seven years. Strong salmon and ground fish harvests in 2004 kept employment in seafood processing jobs slightly positive. However, the timber industry lost jobs in 2004.

After two weak years (attributed in part to 9/11), the visitor industry registered moderate gains. A strong commercial office construction season in Anchorage and major retail expansion in the Mat-Su and Fairbanks North Star boroughs boosted the construction industry's employment figures. Retail employment growth was concentrated in the Fairbanks and Mat-Su boroughs, where a number of new stores opened.

Health care and social assistance were major contributors to employment growth. This one sector contributed approximately half of the overall employment growth, although it slightly down from 2003 figures.

Geographically, half of the six regions of the State reported employment gains relative to 2003 employment levels, while the other three regions lost grounds. Regions that benefited include Anchorage/Mat-Su, interior/Fairbanks, and southwest. These figures are attributed the strong growth in the service sector (health care, leisure and hospitality, finance activities), and construction activity. The three regions whose employment numbers fell included southeast, North Slope, and the Gulf Coast. These losses are attributed to continuing losses in the timber industry and State government in the southeast, declines in the North Slope's local government, and weak seafood processing and leisure and hospitality in the Gulf Coast.

6.2.5.1 2002–2012 Employment Projections

In October 2004, the State Department of Labor and Workforce Development completed

the 2002–2012 occupational forecast covering nearly 700 distinct occupations for both wage and salary and self-employed workers. These are broken down into the following nine basic categories: management, business financial; professional and related; service; sales and related; office and administrative support; construction and extraction; installation, maintenance, and repair; production; and transportation and material moving. The findings estimated an increase of nearly 43,000 jobs from a workforce of 313,540 in 2002 to 356,491 by 2012.

The study divided the economy into two broad sectors: the goods producing sector and the services providing sector. The goods producing sector, which comprises mining, construction, manufacturing, and logging, saw its share of employment decline over the last decade, primarily due to losses in seafood processing and shutdown of pulp mills coupled with meager growth in mining. At the same time, industries in the services sector–including healthcare, food services, transportation, and trade–were experiencing rapid growth, pushing the service sector's share of employment by 2002 to 87 percent.

The service sector is projected to continue its dominance to 2012, and the goods producing sector should hold its own over the forecast period. Buoyed by a resurgence in metal mining and projected natural gas pipeline construction, the goods sector, with the steep declines in manufacturing largely in the past, will be likely to contribute positive growth nearly apace with the economy overall. In doing so it should maintain its 13 percent share of employment through 2012.

The turnaround in goods producing employment notwithstanding, the services providing sector will continue to provide the vast majority, about 90 percent, of new jobs to Alaska's economy. And while the rate of growth of every service sector industry, with the exception of the Federal government, is projected to decrease relative to 1992–2002 rates, many industries will continue to experience robust growth through 2012.

These rapid growth industries have been and will continue to be job creating machines. Continued growth in tourism, air cargo traffic, and the movement of materials and people for construction of the gas pipeline will mean significant employment gains in the transportation and warehousing industry. Both general merchandise stores and food services and drinking places will benefit from growth in tourism, as well as from increases in both population and disposable income. And while efforts to rein in costs may dampen the rate of growth of healthcare industries, demographic realities and an increasing array of treatments will assure that their expansion continues.

In general, just as the services-providing industry sector will dominate job growth, so will the service occupations cluster provide more new job opportunities (fully one-in-four) than any other occupational group. Healthcare support occupations are projected to be the fastest growing of the service jobs, with a growth rate more than twice that of the economy as a whole. While not contributing as many new opportunities to overall job growth as the service occupations, the professional and related occupations cluster will continue to account for the largest share of Alaska's employment in 2012. Contributing both the fastest growth rate and the largest job increase, healthcare practitioner and technical occupations are projected to contribute

more than four-in-ten new jobs to the professional and related cluster through 2012. The balance of the occupational groups in the professional and related cluster, aside from community and social services, will experience much slower growth. A leveling off of projected school enrollments over the decade will keep growth low in education related occupations. The general lack of
growth in the government sectors, a major employer for many professional occupations, will keep employment growth in these occupations reduced.

With growth rates around 20 percent, both the sales-related and the transportation and material moving occupational groups share the distinction of being the fastest growing over the projection period. The former is driven by the demand across industries for cashiers and retail salespersons. The transportation and material moving occupations describe a collection of jobs that are diverse in setting, duties and pay. They include moving people, good and resources by land, air and water; from high paid airline pilots and flight engineers to lower paid taxi drivers and service station attendants. Most of the growth will come from the expanding transportation and warehousing industry as well as natural gas pipeline related hauling. Of the remaining occupational groups, only the construction and extraction occupations are projected to grow faster than average. With a likely slowing in residential building offset by gas pipeline related opportunities, more than 3,000 new jobs are projected for this group. (Alaska Economic Trends, October 2004, pp. 4-12)

6.2.5.2 Employment and the Native Alaskan Workforce

The Native Alaskan labor force increased by 54 percent in the 1980s and by 30 percent in the 1990s. That growth of more than 10,000 people in the labor force each decade was the result of both growth in the population and an increasing share of the population wanting to work in the cash economy. Alaska's expanding economy was able to absorb much of the increase in the Native population wanting to work, but the unemployment rate among Native Alaskans remained high, and the numbers of unemployed Native Alaskans increased along the number of employed. That happened even as the Native Alaskan share of all Alaska workers increased. Based on 2000 census figures, it is projected that the Native Alaskan labor force will increase by an additional 26 percent between 2000 and 2010, due to growth in the Native Alaskan population, even if the share of the population that wants to work remains the same. However, the share of the adult Native Alaskan population in the labor force remains much lower than among non-Natives, and that share can be expected to increase in the coming years, even though many Native Alaskans will continue to take part in subsistence and other activities outside the cash economy.

Strong past economic growth has contributed to economic gains for Native Alaskans, although much of the increase in per capita cash income and declines in the unemployment rate came before 1990. In Anchorage, the Native Alaskan labor force grew much faster in the 1980s than in the 1990s, even though significant numbers of Native Alaskans moved from rural to urban Alaska in the 1990s. Future job opportunities for Native Alaskans will depend on the overall strength of the Alaska economy, as well as on their ability to compete for existing jobs. Much of the growth in the past decade can be traced to an expanding federal government

presence in the economy and to State government spending. Growth in federal spending is unlikely to continue as its recent pace, and the State government as been spending more than it collects for a decade. Although numerous economic development opportunities are available to the State, none offer an immediate alternative to the government spending that has been driving the economy.

Despite these employment gains, the *Status of Alaska Natives Report for 2004* still includes some sobering facts:

- While Native Alaskans gained more than 8,000 jobs between 1990 and 2000, only about 35 percent of all Native Alaskan jobs are full-time and year-round.

- Despite job gains, the number of unemployed Native Alaskans increased 35 percent from 1990 to 2000.

- Incomes of Native Alaskans remain just 50 to 60 percent those of other Alaskans, despite gains. Transfer payments are a growing share of Native Alaskan income.

6.2.5.3 Unemployment and the Native Alaskan Work Force

In 1990, Native Alaskans number 85,698 and constituted just over 15 percent of the State's total population. Of this number, 62 percent of Native Alaskans (about 52,000) lived in village Alaska. Isolation of Native Alaskan people from the cash economy, whether they are rural or urban dwellers, is reflected in unemployment statistics. Statistics from the 1990 census show that while 8.8 percent of Alaska's total work force was unemployed in that year, 22.1 percent of the portion of Alaska's work force was comprised of Native Alaskans was unemployed.

There are thought to be several causes of the Native Alaskan unemployment problem. First, many Native Alaskans live in locations appropriate to a subsistence economy that have not yet become, and quite rightly, may never be, viable in a Western cash economy in the long term. Second, many in rural Alaska still rely on the subsistence economy for many of their needs, due to non-existent transportation routes and the high cost of cash market goods. Third, some Native Alaskans have not yet been able to acquire the skills that would make them employable in the income-producing jobs available where they live. In addition, in rural areas, often they must compete with non-Native non-Residents who take many of the few jobs that are available. Finally, in many cases, employers have not been able to shape jobs that take into consideration the differing life and work patterns of Native Alaskans, and take advantage of Native Alaskan's cultural strengths.

The end result of these issues is reflected in the Native Alaskan unemployment rate. In the 1990 census, Native Alaskan per capita income was only 45.9 percent that of non-Native Alaskans. An estimated 21.5 percent of Native Alaksan families had incomes below the officially established "poverty" line income ($12,674 for a family of four), in contrast to 6.8 percent of all Alaskan families. The 21.5 percent of Native Alaskan families living in poverty

was a far higher percentage than that for whites (4.5 percent), blacks (8.8 percent), Asians and Pacific Islanders (six percent), or other ethnic groups (seven percent). In addition, this does not take into account the higher cost of living in Alaska, particularly in rural Alaska.

6.2.5.4 Employment in Remote Rural Alaska

The mix of jobs in remote rural Alaska reflects the sources of cash coming into the region. Excluding the North Slope Borough (because so many of its jobs are in the enclave oil and gas sector), the largest share of jobs in the region are in government at 29 percent, and in services, at 23 percent. Proprietors (people working for themselves as fishermen or in other occupations) make up an additional 23 percent. Half the remaining 25 percent of jobs are in either trade or infrastructure (transportation and utilities). A large share of the service jobs are in non-profit Native organizations and other businesses that are funded largely by federal contracts and grants.

The job mix in remote areas is heavily weighted toward government and service employment, compared with the mix in an urban area like Anchorage, where trade and other jobs are a much larger part of the mix. Growth in the number of jobs in remote rural Alaska (excluding the North Slope Borough) has been in the range of 400 to 600 per year in the 1990s, with considerable fluctuation from year to year. Job growth has been dominated by new service jobs in the last ten years, with close to 4,000 new jobs added between 1990 and 2000. The second biggest gainer, but a very distant second at 700 jobs, was private basic industries (mining and others). Local government and trade added smaller numbers and the State and federal government lost jobs; mostly military.

The average worker's pay is lower in remote rural Alaska than in Anchorage for all sectors of the economy, even without an adjustment for the higher costs of living in remote areas. The lower average wage in remote areas is due to a combination of lower-wage occupations and fewer average hours worked. Likewise, the share of the population working in rural Alaska is low, and this is reflected in the published unemployment rate for the region, which is high, despite the fact that it does not include people who might want jobs but have given up looking for them. The Alaska Department of Labor bases its figures on a national methodology that defines "unemployed" as only those actively looking for work, and excludes anyone who has made no attempt to find work in the previous four-week period. Most Alaska economists believe that Alaska's rural localities have proportionately more of these "discouraged workers." What is not mentioned by the Department of Labor is that in most rural, remote areas, discouraged workers do not result from those individuals not seeking work, but as a result of no work being available during much of the year. Therefore, after a period of four non-working weeks they drop out of the system and no longer register on unemployment statistics. (Alaskool.org/year–Section 3)

The combination of low average wages and a smaller share of the population with jobs keeps per capita incomes in the rural regions low. In 2001, only the North Slope came close to matching Anchorage income, but that was with no adjustment for the higher costs in remote areas. Real per capita income in remote areas grew rapidly in the 1970s, but more slowly since.

The gap between remote rural and Anchorage per capita incomes remained the same in 2000 as in 1980, with remote income just over half that of Anchorage.

6.2.6 The Remote Rural Economy

Nearly 150 small, mostly Native villages are scattered across the remote expanses of northern interior, western, and southwestern Alaska. This remote part of the State has an economy that is much smaller and quite different from that in urban Alaska. Communities in remote rural Alaska include Wade Hampton, Bethel, Nome, Dillingham, and Yukon-Koyukuk census areas, and the North Slope Northwest Arctic, and Lake and Peninsula Boroughs. All of these communities with the exception of Yukon-Koyukuk, are included in the State's coastal zone. As of 2000, about 41 percent of Native Alaskans lived in remote rural Alaska in villages and in five larger regional centers. Most of the places where Native Alaskans are in the majority are in this part of the State. In fact, there are few places in remote rural Alaska where Natives are not in the majority.

Economic conditions in remote rural areas are not as good as in Anchorage and other urban areas. That is because economic development opportunities in rural areas are limited, a large share of the earnings generated in rural areas leaks out of the local economy, and costs of living are high due to high transportation costs, the severe climate, and small local markets. Subsistence continues to be an important source of well-being among all Native Alaskans but especially for those in the remote parts of the State. About 90 percent of rural households (Native and non-Native) participate in subsistence hunting and fishing, with annual harvests as high as 664 pounds per person in remote rural Alaska.

Outside of the five regional centers (with populations of several thousand) located in the eight census areas that make up the remote rural region of Alaska, the U.S. census counts 147 small communities in this region. The largest of those has a population of just over 1,000, but the median population is 211, meaning half have larger populations and half have smaller. The small size of these villages is both a reflection and a consequence of the economic realities in remote rural Alaska. On the one hand, there is very little private sector economic base in most villages. On the other, the small population means that the local market for business enterprises is quite limited.

In 2000, the combined personal income in remote rural Alaska was $1.269 billion. That was a bit larger than the personal income of just the city of Juneau ($1.047 billion) or of the Matanuska-Susitna Borough) ($1.194 billion), but smaller than that of the Kanai Peninsula Borough ($1.384 billion). Within remote rural Alaska itself there is also considerable variation in total personal income, with Bethel having the largest economy (as measured by personal income), and Lake and Peninsula Borough the smallest. Two census areas of remote rural Alaska do have large private sector economic bases and consequently higher average wages. The average wage of the North Slope Borough is the highest in the region, largely because the borough includes the North Slope oil fields. The next highest wages are in the Northwest Arctic Borough, home to the Red Dog zinc mine. Unfortunately, petroleum and mining are two of the most capital-intensive industries, and as a consequence they create limited demand for local

labor, even though their combined output is several billion dollars a year.

The other census areas in this region have much smaller private sector economic bases, as reflected in their lower average wage. In all these census areas there is commercial fishing, small-scale mining, tourism and recreation, timber, trapping, agriculture, and handicraft manufacture. However all of these activities are on a modest scale and are mostly seasonal, while the oil and production on the North Slope and the Zinc mining in northwest Alaska are major, year-round operations.

Even in the two remote census areas where there are high-paying oil industry and mining jobs, many of those jobs are held by non-residents. In the North Slope Borough, 79 percent of total earnings leaves the region ($421 million in 20000), as non-resident workers return to their homes. It should be noted that while few Native residents of the North Slope Borough work directly in the petroleum industry, local residents benefit indirectly because the oil fields constitute a major tax base for the borough, and the borough has used its tax revenues for capital improvements and other projects that create local jobs. In the Northwest Arctic Borough, about 30 percent of earnings leaked out of the region, or $34 million in 2000. The reported share of earnings that leaks out of the other census areas is much smaller, however this is misleading, since much economic activity in remote rural Alaska passes directly out of the region, without even appearing in reported income accounts.

The remote rural Alaskan economy derives most of its income from the following sources: federal money, Permanent Funds, government and services jobs, and fisheries. By far, federal money makes up the largest share of outside money coming into remote rural areas. Approximately $670 million came into the region in 2000 as wages, purchases, grants, and transfers to individuals, far surpassing the money coming in from private natural resource-related activities. The largest share of federal spending, close to 70 percent, was in the form of grants for capital projects and for operation of local governments, tribal entities, and other non-profit organizations. A small share of spending was for federal military operations and agencies such as the USFWS and the BLM. This amounted to about 900 jobs in 2000, and also generated some spending for goods and services those agencies use. Around 12 percent went directly to individuals in a variety of transfer payments.

Commercial fishing has always been an important part of the private economy of this part of Alaska, but local residents get only a small share of the fishery value, and the overall value of the fishery itself has been falling in recent years. The largest salmon fishery is centered in Bristol Bay, and while the Bristol Bay Borough is outside of the defined "remote rural Alaska," three remote rural census areas have close access to that fishery. Local residents capture only a small share of the value of that fishery. For example, in 2002 the value of the salmon fisheries in waters surrounding the Lake and Peninsula Borough was about $37 million, but local residents captured only about $4 million. The value of the salmon fishery accessible for residents in most of remote rural Alaska was quite small. For example, in Nome it was less than $2 million, and locals captured almost none of that value.

Residents of the remote rural region are able to harvest other seafood in addition to

salmon, and some fish for salmon outside the region. Even so, the gross earnings of residents from State-managed commercial fisheries are quite modest. In 2002, those earnings were less than $2 million in all census areas except Dillingham and Lake and Peninsula Borough, where they were $3.15 million and $4.69 million, respectively. Even though the value of the commercial harvest for local residents is modest, many regional residents are involved in fishing. In 2002, 1,780 resident fishermen participated in the harvest. The average gross earnings per resident permit holder, from all State-managed fisheries, were $6,280. Earnings of fishermen from the Lake and Peninsula Borough alone accounted for about half the gross earnings of permit
holders from throughout the remote rural areas. By contrast, total non-resident participation in the salmon fisheries within the region produced $33.7 million of gross earnings, for gross revenues of $21,000 per permit fished.

There are other flows of cash into the regional economy. Income residents earn outside the region for example, from firefighting, is included, but no estimate of the size of such earnings is available. Dividends paid by ANCSA corporations are one type of non-wage income that comes into the region. However, during the 1990s, 83 percent of all dividends went to shareholders in only three corporations; Cook Inlet, Sealaska, and Arctic Slope. Of those, only Arctic Slope is in the remote rural region. Alaska's State government also provides support for many public services in remote areas such as schools, and provides cash directly to households through the Permanent Fund Dividend Program. In 2002, this amounted to a cash flow of approximately $93 million into the region.

The economy of remote rural Alaska is small from several perspectives, including: average size of community, average household income, total income, and the large share of natural resource (and probably federal spending) earnings that directly leave the region. As a result, it can support only a very limited number of jobs that are not funded by outside sources. Most of these jobs will be in trade, some services, and some infrastructure and construction businesses. This is reflected in the small ratio of jobs in these businesses, compared with total personal income. For example, in Anchorage there are 3.4 jobs in trade per $1 million of personal income. In the four remote rural census areas that have regional centers, there are 1.9 trade jobs per $1

million of personal income. In the three remote census areas without regional centers, there are only 0.6 trade jobs for every $1 million of personal income

For many reasons–including economic but also cultural and others–subsistence hunting and fishing are very important to Native Alaskans and Native communities. An estimated 60 percent of rural households statewide (about half Native and half Non-Native) harvest game and 80 percent harvest fish. The amount harvested varies considerably around Alaska, with residents of more remote rural areas reporting a higher annual harvest. The subsistence harvest of salmon is higher in the remote rural part of the State than elsewhere. In 2000, it varied between 102 fish per subsistence permit in the Chignik management area and 24 in the Unalaska district. In the rest of the State, the average was 22 fish per subsistence permit. Most, but not all, of these fish were harvested by residents in the regions where they lived.

Food and other necessities that require cash continue to cost more in remote rural areas, and because of structural problems, including high transportation costs, severe climate, and small size of communities, the cost of living differential shows little if any trend downward over time. Costs get higher the further one moves from urban Alaska. This can be observed by comparing the residential electricity rate in Anchorage to that in Bethel and also to that in the rest of southwest Alaska, composed of smaller outlying communities. The price of a kilowatt hour is 11 cents in Anchorage and 28 cents in Bethel. The average for the rest of southwest Alaska is 44 cents, before rate relief from the State Power Cost Equalization (PCE) program, which helps pay some of the high costs of electricity in rural areas. Still, the annual cost of electricity for the average residential customer is higher in Bethel and the rest of southwest Alaska than it is in Anchorage, and because personal income is lower, it is also a larger share of the household budget. (Goldsmith, 2004)

6.2.7 Subsistence

Federal and Alaska State law define subsistence as the "customary and traditional uses" of wild resources for food, clothing, fuel, transportation, construction, art, crafts, sharing, and customary trade. Subsistence uses are central to the customs and traditions of many cultural groups in Alaska, including Aleut, Athabaskan, Alutiiq, Euromamerican, Haida, Inupait, Tlingit, Tsimshian, and Yup'ik. Subsistence fishing and hunting are important sources of employment and nutrition in almost all rural coastal communities. 108 out of 129 coastal towns (this figure does not include the boroughs) participate to a greater or lesser extent in the subsistence lifestyle for traditional lifestyle, nourishment, and/or economic purposes. As expected, the coastal communities with the highest percentage of native Alaskan populations correlate with the communities participating in a subsistence lifestyle. *See* Table 1.

Most of the wild food harvested by rural families is composed of fish (about 60 percent by weight), along with land mammals (20 percent), marine mammals (14 percent), birds (two percent), shellfish (two percent) and plants (two percent). Ninety-five percent of rural households consume subsistence-caught fish, according to the State. Fish varieties include salmon, halibut, herring, and whitefish. Seals, sea lion, walrus, beluga, and bowhead whales, and sea otters comprise the marine mammal harvest. Moose, caribou, deer, bear, Dall sheep, mountain goat, and beaver are commonly used land mammals, depending on the community and area. The subsistence food harvest in rural areas represents about two percent of the fish and game harvested annually in Alaska. Commercial fisheries are responsible for the largest amount of take; approximately 97 percent of the statewide harvest (about 2.0 billion pounds annually). Sport fishing and hunting take about one percent of 18.0 million lbs.

Although relatively small in the statewide picture, subsistence fishing and hunting provide a major part of the food supply of rural Alaska and is a major part of the nutritional requirements of Alaska's population. It is estimated that about 43.7 million lbs (usable weight) of wild foods are harvested annually by residents of rural areas of the State, and 9.8 million lbs by urban residents. On a per person basis, the annual wild food harvest is about 375 lbs per person per year for residents of rural areas (about a pound a day per person), and 22 lbs per

person per year for urban areas. The annual harvest for the rural population contains 242 percent of the protein requirements per person (i.e., it contains about 118 grams of protein per person per day; about 49 grams is the mean daily requirement). It also contains 35 percent of the caloric requirements of the rural population (i.e., 840 Kcal/day based on a 2,400 Kcal/day mean daily requirement). Urban wild food harvests provide 15 percent of the protein requirements and two percent of the caloric requirements of the urban population.

Subsistence fishing and hunting are important to the rural economy, and is part of a rural economic system, called a "mixed, subsistence-market" economy. Families invest money into small-scale, efficient technologies to harvest wild food, such as fishwheels, gill nets, motorized skiffs, and snowmachines. Subsistence food production is directed toward meeting the self-limited needs of families and small communities, not market sale or accumulated profit as in commercial market production. Families follow an economic strategy of using a portion of the household monetary earnings to capitalize in subsistence technologies for producing food. This combination of money from paid employment and subsistence food production is what characterizes the mixed, subsistence-market economies of the rural areas. Successful families in rural areas combine jobs with subsistence activities and share wild food harvests with cash-poor households who cannot fish or hunt, such as elders, the disabled, and single mothers with children. Attaching a dollar value to wild food harvests is difficult, as subsistence products do not circulate in markets. However, if families did not have subsistence foods, substitutes would have to be purchased. If one assumes a replacement expense of $3–$5 per pound, the simple replacement value of the wild food harvests in rural Alaska may be estimated at $131.1–$218.6 million dollars annually. (Division of Subsistence, 2000).

Although the economic role of subsistence in many rural localities is undeniably important, in Alaska, it is not the sole function of this activity. A second role of subsistence is sociocultural. The sociocultural function of subsistence is particularly important to Native Alaskan groups, for whom subsistence provides a crucial link between modern sociocultural systems and their ancestral roots, and for whom the acquisition and exchange of subsistence resources helps knit together cohesive societal units. The act of harvest subsistence resources in many cases requires cooperation by several individuals, particularly during times of resource abundance, such as salmon runs and caribou migrations. The shared labor of producing and processing subsistence foods creates and maintains enduring bonds within kin groups, between men and women, and between elders, adults, and younger people.

In many communities, a small number of families (or households) in a village ultimately harvest the vast majority of subsistence resources. A survey of selected communities in the mid-1980s showed that about 30 percent of households generated about 70 percent of the total community subsistence production. These resources are distributed to other households throughout a community, establishing or further defining the relations of mutual aid and obligation among components of a society, as well as providing increased security in a very challenging natural setting.

A third role of subsistence is ceremonial. Once again, this function is particularly important in Native Alaskan groups, for whom subsistence activities and resources incorporate a

set of religious and spiritual beliefs about proper relations between humans and the spirits of the natural world. Subsistence foods are often central components of important indigenous ceremonial events. Examples of such ceremonies include the messenger feasts of the Nunamiut and potlatches of the various Athabascan groups. The first, firmly rooted in tradition, serves to establish relationships between Nunamiut communities through sharing food at large ceremonies. Potlatches are multiday feasts to commemorate an important day (including Christmas), as well as the memory of a recently deceased member of a community. In such ceremonial events subsistence resources play a central role, representing at once the generosity of the spirits of the natural world, and the spiritual maturity of the hunter who has found favor with these spirits and who expresses appreciation for these gifts by sharing freely with others. (BLM, 2002)

Regulation of subsistence in Alaska is a complex topic due the "dual management system" currently in place by the federal and State governments. It is also a controversial political topic because managing subsistence involves making decisions about who has access to Alaska's valuable fish and wildlife resources. Disagreements about subsistence arise between and within different groups, including urban and rural Alaska residents, Natives and non-Natives, subsistence users and non-subsistence users, State lawmakers and other groups. Disagreements include who should get rights to subsistence, how resources are allocated under subsistence provisions, and how such decisions are made.

Subsistence was not a controversial legal issue until the late 1970s, when demands of a growing State population started putting the squeeze on Alaska's available fish and game, and resource managers increasingly were forced to choose between users. But the underpinnings of the management controversy can be traced to Alaska statehood in 1959. On becoming a state, Alaska took over responsibility for managing subsistence from the federal government when it gained authority for managing fish and wildlife. State control of fish and wildlife was a leading argument for statehood, as Alaskans criticized federal fishery management as favoring outside interests and unresponsive to resident needs. The new Alaska Constitution established that fish and wildlife "are reserved to the people for common use" and that "no exclusive right or special privilege of fishery shall be created or authorized." [Alaska Constitution, Article VIII]

For the United States federal government, the question of subsistence surfaced in 1971 when Congress was drafting the ANCSA. The act addressed Native land claims that clouded construction of the TAPS. It extinguished aboriginal hunting and fishing rights in Alaska in exchange for almost $1 billion in cash and 44 million acres of land. ANCSA did not explicitly protect subsistence, but a Congressional conference report issued with the new law stated that Native subsistence practices and subsistence lands would be protected by the State of Alaska and DOI. Congress made good on that promise in 1980, when it passed the landmark ANILCA. Besides creating new national wildlife refuges and public recreation lands, ANILCA mandated that the State maintain a subsistence hunting and fishing preference for rural residents on federal public lands or forfeit its management of subsistence uses there.

The State of Alaska, which had established its own subsistence law in 1978, took note of the discrepancy between the laws and amended State law in 1986 to match ANILCA by limiting

subsistence uses to rural residents. The fix, however, did not last long. In 1989, the State Supreme Court ruled that the rural preference violated Alaska's Constitution, including its "common use" provisions regarding use of fish and wildlife. As the State no longer guaranteed a rural preference for subsistence as required by ANILCA, the federal government moved to take over management of subsistence on federal public lands. Several attempts by the State to reconcile the two laws by amending the Alaska Constitution failed when supporters could not muster enough votes in the Alaska Legislature to send a constitutional amendment to the State's voters. Federal managers took over authority for subsistence on federal lands on July 1, 1990.

In 1995, the U.S. Ninth Circuit Court of Appeals, in adjudicating *Katie John vs. United States*, ruled that ANILCA's subsistence priority extends to freshwater bodies within and alongside federal public lands. The decision pushed the Federal government into management of subsistence fisheries. Realizing that federal subsistence fisheries management would impact fishing statewide, the State of Alaska again attempted to regain management. Between 1997 and 1999, a subsistence task force was convened, two special sessions of the Legislature were held, and Alaska's Congressional delegation twice delayed a federal takeover of subsistence on federal waters through a moratorium. But in the end, the Alaska Senate failed to pass on to voters a constitutional amendment to that would bring State law into compliance with ANILCA. On October 1, 1999, the rural subsistence priority was extended to inland waters within 34 federal parks, forests, wildlife refuges, preserves and recreation lands. Federal subsistence fishery management had arrived.

The area of federal jurisdiction includes 34 wildlife refuges, parks, preserves, monuments, conservation and recreation areas, national wild and scenic rivers and the Tongass and Chugach national forests (not including marine waters). It excludes Glacier Bay National Park, Kenai Fjords National Park, Katmai National Park and the portion of Denali National Park established prior to 1980. This area comprises about 60 percent of lands in the State.

In 1999, federal jurisdiction was extended to include inland rivers and lakes on or adjacent to federal lands, as well as some marine waters. This change put many of Alaska's subsistence fisheries under federal jurisdiction. Most marine waters under federal jurisdiction for subsistence are located in southwest Alaska and along the Alaska Peninsula. They include Cold Bay, Hooper Bay, Toksook Bay, Quinkok Bay, Morzhovoi Bay, Pavlof Bay, Woman's Bay, Chiniak Bay, Gibson's Cove, a section of Saint Paul harbor, the mouth of the Karluk River extending 3,000 feet from shoreline, areas around Seal Cape and Cape Kumliun, three-mile perimeters around Nunivak and Afognak islands, a one-mile perimeter around Simeon Island, and a block around Semidi Islands extending roughly between 55'55" and 56'15" latitude and 156'30" and 157' longitude.

Under ANILCA, rural Alaska residents are eligible for the subsistence priority. Rural residents make up about 20 percent of the State's population. Rural residents are defined as all Alaskans except those living in and around Anchorage, Fairbanks, Juneau, Ketchikan, Adak, Valdez, Wasilla, Palmer, Homer, Kenai and Soldotna.

The federal subsistence priority means that subsistence uses by rural residents are

accorded priority over non-subsistence uses (commercial or sport). To implement this priority, the Federal Subsistence Board can, during times of resource shortage, close non-subsistence uses on federal land to protect fish and game resources or to assure subsistence harvests by rural residents. The Board also reserves the right to restrict non-subsistence uses on federal land. In addition, the Board retains authority to restrict or eliminate uses of federal lands to provide the subsistence priority. It is important to remember that the subsistence "priority" under federal law should lead to restrictions only when a fish stock or game population is not sufficient to provide for uses other than federal subsistence. When stocks or populations are sufficient, all State uses generally are accommodated on federal lands or waters, including State subsistence uses. For example, on federal waters along the Copper River, Alaskans can subsistence fish under State laws and regulations at Chitina while qualified rural subsistence fishermen fishing under federal regulations fish a nearby section of the river.)

Alaska holds exclusive authority to manage subsistence on lands and waters on State and private property in Alaska, or about 40 percent of Alaska lands and rivers. Its jurisdiction also includes most marine waters in the State. The State allows no subsistence fishing or hunting in non-subsistence areas around Anchorage (including the Kenai Peninsula and Matanuska and Susitna valleys), Fairbanks, Juneau, Ketchikan and Valdez.

Under State law, all Alaskans are potentially eligible for the subsistence priority. Like the Federal government, the State of Alaska gives top priority in allocation decisions to subsistence users. Under State management, a subsistence decision begins with a determination that a portion of a fish stock or game population can be harvested for subsistence consistent with sustained yield. Following such a decision, the Board of Fisheries or Board of Game determines what amount of the harvestable portion of the population is reasonably necessary for subsistence uses. Then, regulations are adopted that provide a reasonable opportunity for subsistence. (http://www.subsistmgtinfo.org/fvss.htm; last viewed 8/12/2005)

Chart B: Federal-State Subsistence Comparison

State and federal subsistence laws each grant a priority to subsistence uses of fish and game over other uses. However, elements of the laws differ significantly, creating the differences between State and federal subsistence management programs. This chart illustrates the major differences.

Issue	**Federal**	**State**
Subsistence Users	Rural Alaska Residents	All Alaska Resident
Decision Makers	Regional Advisory Councils and Federal Subsistence Board	Advisory Committees and State Boards of Fish and Game

Jurisdiction	Freshwater streams and lakes on **federal** lands in Alaska and limited marine waters*	Marine waters; freshwater rivers and lakes on **State and private** lands in Alaska
Mandated to Serve	Federally qualified subsistence users	All resource users, including sport and commercial
How Subsistence Priority Works	Other consumptive uses may be **restricted** or **eliminated** to restrict taking of subsistence fish and wildlife	Other uses are **restricted** before a reasonable opportunity for subsistence is restricted
Advisory Group Authority	Advisory council recommendations must be accepted unless not supported by evidence, in violation conservation principles, or detrimental to subsistence	No criteria required for rejection of advisory committee recommendations
What Subsistence Law Must Provide	A meaningful preference for the taking for subsistence uses on federal public lands, with the least adverse impacts on rural residents dependent on subsistence.	A reasonable opportunity that allows a subsistence user to participate in a subsistence fishery that provides a normally diligent participant with a reasonable expectation of success.
Jurisdiction of Subsistence Priority	Within the exterior boundaries of federal public lands, federal reserved waters and some marine waters; does not include Glacier Bay, Denali, and Katmai national parks	Extends to all State and private lands and waters that are outside of non-subsistence areas; the State's five non-subsistence areas are around Anchorage, Fairbanks, Juneau, Ketchikan and Valdez.

*Marine waters under federal jurisdiction for subsistence include Cold Bay, Hooper Bay, Toksook Bay, Quinkok Bay, Morzhovoi Bay, Pavlof Bay, Woman's Bay, Chiniak Bay, Givson's Cove, a section of Saint Paul harbor, the mouth of the Karluk River extending 3,000 feet from the shoreline, areas around Seal Cape and Cape Kumliun, three-mile perimeters around Nunivak and Afokgnak islands, a one-mile perimeter around Simeon Island, and a block around Semidi Islands extending roughly between 55'55" AND 56'15" latitude and 156'30" and 157' longitude. Source: http://www.subsistmgtinfo.org/foscht.htm

7. EFFECTS ANALYSIS

7.1 Discussion of Effects to be Analyzed

Chapter 7 discusses the environmental effects of the alternatives for the three actions evaluated in this EIS: approving the amendments to the ACMP (Section 4.1), denying approval of amendments to the ACMP (Section 4.2), and delaying approval or taking no action in an expeditious manner, or the no action alternative (Section 4.3). The effects under the "no action" alternative are the same as those for alternative number two, since OCRM delaying approval or taking no action will produce the same results as denying approval, which is the repeal of the ACMP, pursuant to State legislation.

OCRM's approval of incorporation of HBs 69, 86, 191, SB 102, revisions to statute AS 46, and State regulations 11 AAC 110, 11 AAC 112, and 11 AAC 114 as an amendment to the ACMP, in accordance with OCRM regulations on Amendments to Approved Management Programs (15 C.F.R. 923.80), in and of itself, has direct socioeconomic effects. These include the State's ability to continue using the federal consistency provisions of the CZMA, and the continued receipt of approximately $2.5 million dollars annually to conduct its coastal management program, in addition to ancillary federal funds which might be tied via legislation or regulation to requirements on states to be participating in the federal Coastal Zone Management Program (e.g., Coastal Estuarine Land Conservation Program). However, due to State legislation repealing the ACMP, OCRM's approval will ensure the continued application of the ACMP, including its standards and local district programs. It will also have the effect of implementing the changes that the State has proposed under the legislation identified above, which may have cumulative and secondary effects on the affected environment. Thus, the discussion of environmental effects will cover the primary, secondary, and cumulative effects of the three alternatives.

7.2 Criteria for Evaluating the Effects of Approving or Denying Amendments to the ACMP

Many of the effects of approving or denying amendments to the ACMP are difficult to analyze because they are secondary and dependent on separate, future, discretionary actions by a variety of entities (e.g. federal, State, local and Native Alaskan entities may make permitting decisions or impose conditions on permits that could positively or negatively affect coastal resources). Those future actions and associated environmental effects are hard to predict, although reasonable conclusions about the likely effects can be inferred from recent history of agency actions. The following sections provide a qualitative analysis of the effects of the alternatives on the affected environment described in section six.

In the event of OCRM's approval of the amendments to the ACMP, it is likely that effects would occur from implementation of the following changes to the ACMP:

- AS 46.40.040(b), AS 46.40.096(g) and (k), and 11 AAC 110.040 Exclusion of DEC permits and authorizations (the "DEC carve-out")

- 11 AAC 112.210 expanded definition of Natural Hazard Areas

- 11 AAC 112.220 requirement that State agencies and districts ensure projects maintain and increase coastal access to, from, and along coastal waters

- 11 AAC 112.230 change to siting and approving energy facilities so it is now based on "the extent practicable; removal from consideration of not selecting sites in productive habitat, as well as removal of the standard of selecting sites in areas which are designated for industrial purposes and where industrial traffic is minimized through population centers, and broader interpretation of energy facilities.

- 11 AAC 112.240 changes to the standard of "practicable inland alternative" for the Utility Routes and Facilities policy."

- 11 AAC 112.260 removal of all references to mining in the coastal policies; and new standard of 'no practicable alternative."

- 11 AAC 112.270 changes to the Subsistence standard that (1) require designation of subsistence areas; (2) remove requirement for State agencies and district to recognize and assure opportunities for subsistence use of coastal areas and resources; and (3) change the standards from safeguards to "avoid or minimize impacts to subsistence."

- 11 AAC 112.300 removal of language requiring that each type of habitat be managed to "maintain or enhance the biological, physical, and chemical characteristics of the habitat which contribute to its capacity to support living resources; rewrite of the majority of habitat standards for specific habitat values, including for offshore areas, estuaries, wetlands, tideflats, exposed high-energy coasts, and rivers, lakes and streams.

- 6 AAC 80.900(15) removal of "Important Upland Habitat."

- 11 AAC 114.010—11 AAC 114.020 relocation of the ACMP from the Division of Governmental Coordination in the Governor's Office into the OPMP within DNR, and the Alaska CPC was dissolved.

- 11 AAC 114.200 – 11 AAC 114.385 district plan development and implementation, including resource inventory and resource analysis requirements; changes to subject uses; new designation requirements; and new policy development requirements.

- SB 102 sunset of ACMP on May 10, 2006 (essentially, Alternative 2, or no action alternative).

- HB 69 automatic determination that all shallow natural gas exploration and development activities in the coastal area meeting certain requirements are considered to be de minimis in nature and therefore automatically consistent with the ACMP; specifically in areas of the coastal area that have valuable and developable coal deposits that may yield natural gas.

It is noted here that alternatives 2 and 3 would both ultimately result in the revocation of the ACMP, and therefore the same effects. Therefore the discussion for both of these alternatives has been combined, and either follows the presentation of consideration of alternative 1 for each change, or for an entire section. In addition, effects may be positive, neutral or adverse.

7.3 HB 191, 11 AAC 110 Changes to Consistency, and HB 86

This section discusses the effects, if any, from changes in the ACMP's consistency process as discussed in section 5.3.1.

7.3.1 Alternative 1 – Effects of Program Change

7.3.1.1 Lead agency

Under Alternative 1, OPMP's assumption of duties as the lead State agency will have neutral effects since it is not expected to have significant changes on the ACMP. There may be positive effects to permitting program efficiency since State agency coordination may improve now that the lead agency is located within a principal coastal resource agency (DNR).

7.3.1.2 Trigger Point for Consistency Review

AS 46.40.096(j) and 11 AAC 110.010(b). (The ACMP Program Document (June 2, 2005) at section 6.1 incorrectly cites 11 AAC 110.050(b).) There will be no effects from this change under Alternative 1.

7.3.1.3 Scope of Review

Alternative 1 will have a positive effect on the State's permitting process. By specifying the scope of review for State permits to activities located within the coastal zone and geographic location descriptions subject to a State resource agency permit, or the subject of a coastal district enforceable policy, the State permit process will be more predictable and transparent.

7.3.1.4 Phasing

Alternative 1 will have a neutral effect on the State's permitting process. Phasing is an administrative tool to review distinct parts of a project while not holding up earlier phases. OCRM's federal consistency regulations specifically allow for phased review of federal activities. Extending Alaska's phasing provisions to projects other than oil and gas projects, where the projects lend themselves to distinct phases should not affect Alaska's ability to review entire projects or significantly affect the districts' or public's ability to comment on the projects. While specific aspects of later phases may not be available at earlier phases, the totality of the project will be known and the State should be able to identify cumulative impacts from later phases.

7.3.1.5 Elevation

Alternative 1 will have a positive effect on Alaska's overall permitting process and therefore, the State's economy. By limiting elevation to only the DNR commissioner the effect of this change will provide for more efficient and expedited decisions. Parties to elevations will likely need to be diligent in meeting deadlines and presenting their cases in a complete manner.

7.3.1.6 Third Party Lawsuits

Alternative 1 will have a neutral effect on the State's physical resources, and a positive

effect on socio-economic resources. The effect of removing third party lawsuits may result in ensuring that only those parties with a meaningful interest have standing to sue. However, another effect could be that third parties with concerns about some projects would be able to seek redress through the State courts.

7.3.1.7 Exclusion of Alaska DEC Permits and Authorizations (the "DEC carve-out")

While the DEC carve-out is a change in the ACMP consistency process, it is not apparent at this point whether the DEC carve-out will affect the operation of the ACMP policies or significantly affect the human environment. The single most important process effect of this change is that districts may no longer adopt policies that address DEC authorities. For example, districts, may not adopt policies on oil-spill prevention or nonpoint source pollution. While these process changes limit the scope of district policies, the DEC policies and standards remain as the air and water quality standards of the ACMP. The DEC permitting process still includes a public review and comment period. Interested members of the public, including coastal districts, can comment directly to DEC on any concerns with a proposed activity. Districts also have the ability to provide comments to DEC on DEC-coordinated consistency reviews and can be afforded due deference by the reviewing agency in accordance with the process described on pages 136-138 of the ACMP program submission (Appendix C).

In addition, the DEC policies will still be applied to federal lands and the OCS through the CZMA federal consistency review process. Moreover, having the DEC standards be the only air and water quality standards for the ACMP complies fully with CZMA section 307(f) (16 U.S.C. 1456(f)), that water and air pollution control requirements developed by the Federal government or by any State or local government shall be the water and air pollution control requirements applicable to a state's coastal management program. Thus, it is not apparent that this provision will result in a change in the level of environmental protection afforded by the ACMP.

7.3.7.1.1 DEC and OCS Activities

One of the issues raised during the scoping process was how the State would have the ability to address air and water quality issues related to OCS activities, since DEC does not have authority in the OCS. The amended ACMP does not change how the State or the public comments on proposed development on the OCS. All OCS activity is evaluated under NEPA through MMS' preparation of an EIS and Alaska's review under the CZMA federal consistency provision. The State (and members of the public, if they wish) comment on the proposed activity through the scoping process, and on the draft EIS and during Alaska's CZMA review comment period. Among other considerations, the State would closely review the proposed OCS activity for potential impacts on coastal resources and the enforceable policies that apply to the affected coastal resources. DNR OPMP, rather than DEC would be the State's lead for coordinating comments on the MMS EIS and the CZMA review. DEC provides comments to DNR for use in the consolidated State comments to MMS.

AS 46.40.040(b)(2) addresses activities that do not require a DEC authorization because

the activity is a federal activity, or is located on federal lands or a part of the OCS. In these cases, under 11 AAC 112.310, the activities must still be found consistent with DEC's standards, even though the activity does not require a DEC authorization. So in order to achieve the federally mandated coordinated consistency review DEC, nonetheless, applies its regulatory standards to the proposed activity and forwards its findings to OPMP to include in DNR's CZMA federal consistency decision. This section conforms to 11 AAC 112.310 and the CZMA's requirement (CZMA section 307(f)) that the State's air and water quality standards be included in the State's coastal program.

While any State agency could comment, agencies that would typically comment on an OCS activity would be DNR, DEC, and the Department of Fish and Game. The level of involvement of these agencies would depend upon the scope of the proposed OCS activity.

The review process for Alaska's federal consistency decision is set out at 11 AAC 110.300 – 11 AAC 110.355. OPMP is the coordinating agency for the review of a federal consistency determination submitted by a federal agency. 11 AAC 110.030(e) provides that OPMP will coordinate with DEC and issue its findings under AS 46.04.040(b)(2) where there is no DEC authorization because the activity is a federal activity or the activity is located on federal land.

7.3.1.8 Time Limitations and Certainty for Consistency Reviews

Alternative 1 will result in a positive effect for overall administration of the ACMP permitting process, thereby likely having a positive effect on economic conditions in the State. By establishing a time limitation and deadline for completing the consistency review process, the State permit process will be more predictable and efficient. This change will require that permit reviewers be diligent in following public notices, and providing comments. Overall, however, the deadline is consistent with CZMA policies and regulations to improve the efficiency and predictability of decision-making.

7.3.1.9 ABC List, General Permits

Alternative 1 would have a neutral effect on the physical and socio-economic environments because the changes to the ABC List provided as part of the ACMP program submission are technical and editorial updates. The ABC List provides expedited consistency reviews for those activities that are de minimis in nature and/or are routine and can be stipulated into compliance through the application of established alternative measures.

7.3.2 Alternatives 2 and 3 – Effect of No ACMP

Alternatives 2 and 3 would have negative impacts on the physical and socio-economic environment. The result under alternative 2 or 3 is that Alaska would no longer have a federally approved CZMA program and, therefore, the CZMA federal consistency provision would no longer apply to federal agency activities, federal license or permit activities, OCS oil and gas plans or federal financial assistance activities. Federal agencies and applicants for federal

authorizations or funds would not have to coordinate with the State under the CZMA and would not have to be consistent with State or district enforceable policies. Alaska would have no basis or authority to request such CZMA reviews. Alaska and the districts would only have review of federal actions as provided for by federal laws other than the CZMA. Review under other federal laws, where such reviews are provided for, would be significantly more limited in scope than the CZMA review, both in terms of Alaska laws and district enforceable policies that would apply and in a less comprehensive review. Depending on the type and frequency of the federal actions, the result may be physical deterioration of natural resources, since many federal actions would no longer have to be consistent with Alaska policies. There may also be deterioration of the management of important coastal uses such as subsistence use, since federal actions affecting subsistence uses and resources would no longer be subject to Alaska's coastal standards and district policies through the CZMA federal consistency review process, although there are other State and federal laws and managed programs, both inside and outside the coastal zone, addressing uses and resources, such as subsistence. The public would also lose its ability to comment on many federal actions through the CZMA federal consistency public review process.

7.4 HB 191, 11 AAC 112 Revisions to Statewide Coastal Standards

This section discusses the effects related to changes to the ACMP Statewide Coastal Standards at 11 AAC 112, as described above in section 5.3.2.

7.4.1 11 AAC 112.210 Natural Hazard Areas

7.4.1.1 Alternative 1— Effects of Program Change

Alternative 1 may have a positive effect on the physical environment. The natural hazard standard establishes the designation of natural hazards as a planning function, and sets the standard by which proposed projects must comply. The standard applies throughout the coastal area to those natural hazards designated by DNR or a coastal district. The new standard will broaden the coverage of the old geophysical hazards standard and allows coastal districts to both identify natural hazards not identified under 11 AAC 112.990 and designate natural hazard areas in their district plans for both. A broader definition of coastal hazard areas will allow the State and districts to expand coverage for areas previously not covered by the coastal hazard standards. Districts may develop enforceable policies related to natural hazards, and may apply those policies to activities occurring in or, as provided for at 11 AAC 110.015, affecting an area designated in their district plan as a natural hazard area. Furthermore, the standard recognizes that municipalities retain their Title 29 zoning and building code authorities to address the project details of natural hazard mitigation measures.

The changes to the previous geophysical hazard standard provide greater certainty regarding what constitutes a hazard, what is meant by "siting, design, and construction measures for minimizing property damage and protecting against loss of life." The changes have also improved on the existing standard by providing for coordinating agency consultation with appropriate natural hazard experts in the DGGS, the flood Program in the Department of Community and Economic Development, and "other local or State agencies with expertise." In

addition, the new standard allows State agencies to identify natural hazard areas during a project review. Finally, 11 AAC 112.990 has been amended to require demonstration of a scientific basis and supporting evidence for the designation of additional natural processes or adverse conditions not included in the definition as "natural hazards."

7.4.1.2 Alternatives 2 and 3 – Effects of No ACMP

Alternatives 2 and 3 would likely have a negative effect on the physical environment. The State and districts would no longer have coastal programs and plans, and federal and State consistency would not apply to projects in coastal areas. The existing Federal, State, and local government laws would continue to be in effect, however, there would be no consolidated review for impacts on coastal resources, nor would federal or State agencies be required to take into consideration standards that specifically address coastal resources.

7.4.2 11 AAC 112.220 Coastal Access

7.4.2.1 Alternative 1 – Effects of Program Change

Alternative 1 would have a neutral effect on the physical and socio-economic environment. Under the change to the State's standards, coastal access has now replaced the term "recreation," although it has retained essentially the same definition in terms of the designation of recreational use areas (*See* section AAC 114.250(c)(d)). However, the revised ACMP now requires that State agencies and districts "ensure" that projects maintain, and where appropriate, increase public access to, from, and along coastal waters rather than the previous standard, which was "give high priority to" public access. District enforceable policies may be district wide or area specific. The State standard is written broadly enough such that a coastal district could write more specific enforceable policies. For example, a district could list what appropriate access is in publicly-owned waterfront property, and under what circumstances it is appropriate to mandate increasing that access. In this sense, the State has improved the status of access requirement via "ensuring" rather than "giving "high priority to" public access.

However, the scope of the policy is also now limited to the boundary of the new definition of "coastal waters," which means "waters containing a quantity or percentage of sea water (11 AAC 112.990 (7)). Prior to the program amendments, coastal waters were defined as "all water bodies in the coastal area, including wetlands and the intertidal area. Therefore, the requirements for ensuring public access will now apply to an unquantified smaller area of the State's coastal zone. Between these two changes, this revision is considered to have a neutral effect.

In terms of the socio-economic effects; the revised policy may incur an additional financial burden on waterfront developments that are required to include public access as part of their projects either through application of State or district policies. In addition to design elements, businesses may have to take into consideration additional property insurance premiums. However, the general public will benefit from additional public access opportunities to the waterfront, and other local businesses are likely to experience positive economic benefits

from having an accessible waterfront.

7.4.2.2 Alternatives 2 and 3 – Effects of No ACMP

Alternatives 2 and 3 would likely have negative effects on the socio-economic environment. The State and districts would no longer have coastal programs and plans, and there would be no State public access standard with which federal, State, or local governments would ensure consistency as part of permit approval. There may continue to be local public access requirements, however, they could not be used for consistency purposes for federal and State projects. The result might be a reduction in the amount of public access available to coastal residents and visitors, which in turn could result in reduced enjoyment of the coastal area, as well as a loss of revenue in waterfront areas that attract tourists.

7.4.3 11 AAC 112.230 Energy Facilities

The State made several changes to the Energy Facilities standard which will have to be analyzed individually for their differing effects on the physical and socio-economic environment. Each of these changes is discussed separately below.

7.4.3.1 Alternative 1 – Effects of Program Change

7.4.3.1.1 "Extent Practicable"

Changing the basis for the siting and approval of major energy facilities by districts and State agencies from "to the extent feasible and prudent" to "the extent practicable" is likely to have a neutral effect on the physical and socio-economic environment. The State's definition of the term "practicable" at 11 AAC 112.990(18) is "feasible in light of overall project purposes after considering cost, existing technology, and logistics of compliance with the standards." This amended definition establishes that (1) an applicant must comply with the coastal standards unless compliance is not feasible (as defined); and (2) incorporates the term "in light of overall project purposes." In other words, if costs/logistics factors do not make compliance with the standards impracticable, then the standards must be met. This is potentially more stringent than the previous standard of "feasible and prudent," which used an unpredictable balancing test to determine whether the standard must be met. Also, the new definition allows a project reviewer the discretion to examine the overall worth of the project, balanced against the effect that it (or implementation of one of its component activities) might have on coastal resources, public benefit, and the rights of individual or collective stakeholders. The change in the basis is unlikely to make a significant difference in the designation decisions made by State agencies and districts.

7.4.3.1.2 Changes to Criteria

The State made two significant changes to the criteria for where to site energy facilities, the second of which, described below, may result in negative impacts to the physical and socio-economic environment. First, the State has changed the criteria's wording by removing the

language “in productive habitat” from the criteria, “select sites where development will require minimal site clearing, dredging and construction in productive habitat.” Under alternative 1, this change would have a neutral effect on the physical environment because language in several other of the criteria used for siting development of major energy facilities will ensure the protection of productive habitat. Criteria 11 through 14 continue to cover consideration of: fishing grounds, spawning grounds, other biologically productive or vulnerable habitats, including marine mammal rookeries and hauling out grounds and waterfowl nesting areas, areas for the free passage and movement of fish and wildlife with due consideration for historic migratory patterns, particular scenic, recreational, environmental or cultural value identified in district plans, and areas of least biological productivity, diversity, and vulnerability.

The second change to the energy facilities criteria may potentially have negative effects for the physical and socio-economic environments. The State has removed the criteria for siting energy facilities, “selecting sites in areas which are designated for industrial purposes and where industrial traffic is minimized through population centers.” The State’s rationale for taking this action was that “traffic standards are more properly applied through local zoning, ordinances, and other title 29 authority.” However, during the program amendment public meetings several of the district and local program representatives stated that relying on local zoning, ordinances and title 29 authorities will not be an effective substitute for the ACMP standards and criteria, since not all local government have these types of authorities in place, and it will be a hardship for districts with title 29 authority to develop them. If this criterion is removed from consideration during siting of major energy facilities, it could result in siting facilities where they would have negative impacts on population centers not appropriate for industrial purposes and industrial traffic. Potential impacts include increased noise, air pollution, increased exposure to hazardous chemicals, increased potential for danger to populations related to accidents and spills of hazardous materials, and reduction in property values.

7.4.3.1.3 Redefinition of Major Energy Facility

The last change made to the Energy Facilities standard is the further definition of “uses authorized by the issuance of state and federal leases for mineral and petroleum resource extraction” to include easements, contracts, rights-of-way, or permits for mineral and petroleum resource extraction. This change will have a positive effect on the physical and socio-economic environment. DNR found the term “major energy facility” in 6 AAC 80.900(1), vague and unwieldy, and too limiting with its requirement that all the listed items be “facilities,” since this could conceivably exclude some exploration-type activities that were intended to be included. In response to confusion over the definition of the term, the definition was amended to address the concern that only “facilities” were covered, although it is clear that “facilities” are still covered. The further definition of the term now includes natural gas pipelines, rights-of-way and natural gas treatment and processing facilities.

The State’s ability to comment on OCS oil and gas development has not changed as a result of the new regulations. The original language is from the consistency review regulations in 6 AAC 50 adopted in February 2003 and previously approved by OCRM. The geographical scope of the ACMP in that previous regulation and 11 AAC 110.010(c) includes federal lands

and the OCS. HB 191 specifically addresses OCS reviews in the context of DEC standards in AS 46.40.040(b)(2). Also, AS 46.40.210's definition of State coastal zone explicitly includes federal lands and OCS.

7.4.3.2 Alternatives 2 and 3 – Effects of No ACMP

Alternatives 2 and 3 would have negative effects on the physical and socio-economic environment. The State and districts would no longer have coastal programs and plans, and there would be no energy facility standard that the State or districts could use to ensure consistency. There may continue to be standards related to separate federal, State and local laws and regulations, however, these would not be coordinated, nor would they necessarily achieve a previously agreed-upon level of protection for the physical environment, nor could they be used for consistency purposes for federal and State projects. The result would likely be physical deterioration of natural resources and the environment, a delay in the siting and permitting of energy facilities along with the associated costs and loss of business investment, and an increased amount of litigation. Districts would lose their ability to influence the siting of major energy facilities through the loss of the district plan process.

7.4.4 11 AAC 112.240 Utility Routes and Facilities

7.4.4.1 Alternative 1 – Effects of Program Change

Alternative 1 will have neutral effects on the physical and socio-economic environments. Alaska's pre-existing standard combined transportation and utility routes and facilities within one standard, i.e., "Transportation and Utilities." Under the proposed standards, the State has separated the two uses; utilities routes and facilities, and transportation routes and facilities. In part this is because transportation routes and facilities are typically not located on the beaches and shorelines, which is reflected in the new, separate policies for these uses discussed in more detail below. The State's and districts' utility routes and facilities policies will apply within the coastal area. District enforceable policies may be district wide or area specific, and can be located on beaches and shorelines, throughout the coastal area, or even inland, providing the policies meet the criteria at 11 AAC 114.270(h). In addition, the standard was revised to require that utility routes and facilities be sited inland unless it is water-dependent or water-related, or no "practicable inland alternative exists." These changes are all clarifications and further definition that are unlikely to result in application of the State's standards or districts' policies in a way that would impact either the physical or socio-economic environment of the State.

7.4.4.2 Alternatives 2 and 3 – Effects of No ACMP

Alternatives 2 and 3 would likely have negative effects on the physical and socio-economic environment—specifically water quality, wildlife transit, and subsistence access. The State and districts would no longer have a coastal program and plans, and they would be unable to apply coastal utility routes and facilities standards for consistency purposes for other federal, State or local permits. The result could be a reduction in protection for coastal resources and in due to the inappropriate siting of utilities routes and facilities in the coastal area or in areas that

would have negative impacts on coastal areas.

7.4.5 11 AAC 112.260 Mining, Sand and Gravel

7.4.5.1 Alternative 1 – Effects of Program Change

Alternative 1 should have a neutral effect on the physical and socio-economic environments. Under 11 AAC 112.260, the word "mining" has been removed as a use that is reviewed by the State's coastal management program. Previously, the coastal policies stated:

> Mining and mineral processing in the coastal area must be regulated, designed, and conducted so as to be compatible with the standards contained in this chapter, adjacent uses and activities, statewide and national needs, and district programs.

The new policy does not address mining. Alaska's program submittal states that this change does not mean that mining will not be regulated in the State's coastal area, and is reflective of the original program's wording that "while mining and mineral processing have impacts on coastal values, most of these impacts are addressed by other ACMP standards." Or as the State explains,

> the standard was changed to reflect that the former regulation simply repeated the substantial mining regulations already in place (e.g., suction dredging in a waterbody designated as important for the spawning, rearing, or migration of anadromous fish is required to obtain a Recreational Suction Dredge Permit from the DNR Office of Habitat Management and Permitting (OHMP)

The State goes on to explain that it deleted mining as a use in order to comply with HB 191's legislative mandate to "eliminate duplication or restatement of other State or federal requirements." If a district still has local issues after considering the application of State and federal mining requirements, then it can still address mining-related activities through its other district policies for utility routes and facilities, transportation routes and facilities, energy facilities, or subsistence, or other standards under Section 11 AAC 114.

Existing State and federal laws and regulations will continue to be applied as they currently are, and there will be no change in the level of protection typically afforded to Alaska's coastal resources insomuch as that application was not dependent on the ACMP for implementation. However, there are other implications.

First, the original effect of the mining standard was to ensure that mining activities either taking place in the State's coastal zone, or having effects on the State's coastal resources would have to be "regulated, designed and conducted" so that it met all of the other standards in the State's coastal program, including the State's habitat and subsistence standards, and any district program policies that included mining policies. Under the CZMA and its federal consistency provisions, this included mining activities that occurred on federal lands, if they affected the

State's or a district's coastal resources. With the removal of mining as a specific use of concern to the ACMP, while other State and federal laws may apply to mining-related activities, federal agency activities are no longer required to be consistent with State and district coastal standards. Three federal permits are required for conducting mining activities in Alaska: EPA (NPDES for discharge of water into stream, river, wetland, or any other natural body of water), ACOE (404 and general permits for activities in wetlands), and BLM (Land Use Permit for long term camping when using a suction dredge on a State navigable river). None of these include policies that are specific to local district resources or issues.

In terms of mining on State lands, the removal of "mining" from the ACMP standards will have a similar effect. While State laws will continue to apply to mining-related activities, previously, mining activities themselves were required to be consistent with the State's coastal standards and district program policies. The district programs had specific policies, many of which included being involved in the siting and planning process. These assurances have been removed. While these assurances have been removed and the districts' input lessened, there is not sufficient evidence to suggest that mining regulation under State laws and not through the State CZMA program will result in significant new impacts to the human environment.

While these are changes to how Alaska has previously addressed mining through the ACMP, the issue that must be addressed is whether this change to the mining standard will result in any significant impacts to the affected resources. Mining will continue to be a regulated activity in the State's coastal area through other State coastal standards, and State and federal permits. The State's original coastal program did not include any specific standards for mining or mining-related activities, also finding that they would be addressed through the other ACMP standards (although the State was not specific regarding which of these standards would "catch" other mining activities).

Ultimately, the final impact is that districts that currently have mining-specific standards in place will lose their ability to apply them, and will experience difficulty adopting other-such standards due to the new district plan guidance (*See* discussion below). While this analysis cannot determine what the precise impacts to coastal resources will result from this change, it is clear that mining and mining processes will continue to be environmental concerns in Alaska's coastal area well into the future.

7.4.5.2 Alternatives 2 and 3 – Effects of No ACMP

Alternatives 2 and 3 would likely have negative effects on the physical environment, essentially the same as Alternative 1. Insomuch as there are other standards within the ACMP that would continue to address other effects from mining activities, alternatives 2 and 3 would be worse than alternative 1.

7.4.6 11 AAC 112.270 Subsistence

The State has made significant revisions to the ACMP's subsistence standards. These include:

- The removal of the coast-wide requirement that districts and State agencies recognize and assure opportunities for subsistence usage of coastal areas and resources;

- Districts are now required to designate subsistence areas where subsistence policies apply. Previously, districts identified areas in which subsistence is the dominant use of coastal resources, and after appropriate consultation designated such areas as subsistence zones where subsistence uses and activities had priority over all non-subsistence uses and activities;

- The standard for addressing impacts from authorized uses within a designated subsistence area has been changed from providing "appropriate safeguards to assure subsistence usage" to "must avoid or minimize impacts to subsistence uses of coastal resources." Concerns have been expressed that the State has failed to include opportunities to mitigate any negative impacts.

- The requirement for districts sharing migratory fish and game resources to submit compatible plans for habitat management has been removed.

7.4.6.1 Alternative 1 – Effects of Program Change

Under Alternative 1, the revised subsistence standard may have negative effects on subsistence resources and subsistence lifestyles, however, this may be offset by the continued requirements of other federal and state subsistence laws and program requirements. The State has removed the overarching requirement that districts and state agencies recognize and assure opportunities for subsistence usage of coastal areas and resources. However, the State has retained the ability for: (1) the State to designate subsistence areas; (2) districts to designate subsistence areas and develop subsistence policies; and (3) for State and district policies to apply to federal actions located outside designated areas if the federal action will have an effect on subsistence uses, regardless of the location of the federal action or where the effect to subsistence uses occur. The State's revised standards still ensure that districts and State agencies have the opportunity to recognize and assure subsistence usage of coastal areas and resources through the requirements for designation of subsistence areas.

While the previous standard also required identification of areas where subsistence is the "dominant" use of coastal resources, and designation of these areas as subsistence zones in which subsistence uses and activities had priority over all non-subsistence uses and activities, these designations did not restrict application of the overall standard of recognizing and assuring opportunities for subsistence usage areas and resources throughout the State and districts' coastal area. The major difference under 11 AAC 114.250(g) is that the State or a district subsistence policies only apply outside designated areas if there is a federal action reviewed through the federal consistency process, and not other activities occurring outside a designated subsistence use area and that does not have a federal connection. Designations may be made anywhere in the coastal area (based on demonstration of subsistence use), although, as before, designations are not allowed on federal land.

As described above and provided for at 11 AAC 110.015, the subsistence standard is applied when a use or activity subject to the consistency review is proposed to be located within or affect an approved designated area in which subsistence use is an important use of coastal resources. Under 11 AAC 114.270, a district may then develop enforceable policies that will be used to determine whether a specific land or water use or activity will be allowed. Therefore, unless the State or district has designated a subsistence use area, the State or district subsistence policies cannot be applied even if subsistence resources are being affected.

Designating subsistence areas requires gathering a significant amount of information. According to the State, "the major sideboards to the districts' right to establish enforceable policies, including designation of a subsistence priority, is the "matter of local concern" test in AS 46.40/070(a)(2)(c) and the requirement that the policies "not arbitrarily or unreasonably restrict or exclude uses of state concern." Thus, a district may establish an enforceable policy concerning a given use or resource, e.g., subsistence, under the "matter of local concern" test as long as the district can demonstrate that the use or resource is (1) sensitive to development; (2) not adequately addressed by State or federal law; and (3) of unique concern to the coastal resource district.

Districts do not develop enforceable policies to apply within their designated subsistence use areas. The State has found that because the State standard applies to areas designated by a district, and the State standard provides the specific criteria that apply to uses or activities within the designated area, a district does not have to write an enforceable policy in its plan.

One of the major issues identified in the scoping process is the new standard's requirements that projects designated in subsistence areas are required to "avoid or minimize impacts to subsistence uses of coastal resources," rather than provide mitigation for any damages that will occur as the result of a project being approved. Many commenters felt that any projects approved in subsistence use areas that result in impacts to subsistence resources should still be required to provide mitigation for those impacts, whether they were minimized or not. Others felt that the State's standard and explanation that it would "not authorize" any projects that did not meet the "avoid or minimize" standard was insufficient promise and unrealistic.

Districts that are in the process of developing their new plans have stated that the practical application of the new subsistence standard for the ACMP is that they are unable to develop any enforceable policies for subsistence areas beyond "allowing or disallowing a use," and those policies may not address subsistence access, level of need, or a subsistence use priority. (*See* scoping comments from North Slope Borough, Lake and Peninsula Borough, Bristol Bay CRSA at Appendix D). This interpretation stems from the State's "flow from" policy (*See* discussion at 5.1.3.2.5).

There are likely to be some negative impacts to subsistence resources if even 'minimized' impacts that could have been mitigated under the previous state coastal standards, are now not permitted to be addressed under the new policy. Any negative impact to coastal subsistence resources will likely have negative impacts on economic and cultural conditions of importance to

coastal populations, which represent both large minority and lower income groups.

Other State and federal laws provide a priority for subsistence uses, and this would serve as a mitigating factor to any reduction in the districts abilities to develop subsistence use policies. The Federal Subsistence Board assumed a role in the management of subsistence taking of wildlife on federal public lands in Alaska on July 1, 1990. Its role expanded on October 1, 1999 to include taking fish in rivers, lakes and marine waters adjacent to federal public lands. Federal public lands are those managed by the USFWS, NPS, BLM, Bureau of Indian Affairs, and the U.S. Department of Agriculture Forest Service. At the State level, the State's Division of Subsistence conducts research to document subsistence uses, estimates subsistence harvest levels, and evaluates potential impacts to subsistence users from other uses. Research findings are compiled and analyzed to address fish and wildlife management and regulatory issues and to provide information for State and federal land use planning. When the Alaska Board of Fisheries or the Alaska Board of Game meets, a representative of the federal board serves as a liaison and participates in the board discussions. When the Federal Subsistence Board meets, the Commissioner of Alaska Fish and Game participates as a nonvoting member on the board. In addition, a representative of the department of Fish and Game provides information and positions from the department. An Interim Memorandum of Agreement to coordinate fisheries and wildlife management for subsistence uses on federal public lands in Alaska was authorized in April 2002. The agreement provides a foundation and direction for coordinating subsistence management consistent with State and federal statutes in order to protect and promote the sustained health of fish and wildlife populations, ensure conservation and stability in management, and include meaningful public involvement. (http://www.boards.adfg.state.ak.us/bofgfsb/index.php, last viewed 8/26/05)

In addition to higher level coordination on subsistence issues, State and federal agencies also work with Native Alaska governments to address subsistence issues as part of project development. For example, the ADFG and Alaska Boards of Fisheries and Game have a policy on government-to-government relations with federally-recognized tribes of Alaska regarding department or board actions that significantly or uniquely affect a tribal government in Alaska and pertaining to any tribal action that significantly or uniquely affects the department or boards. The goal is to ensure the department conducts consultations in a culturally sensitive manner, and promote coordination with the tribes prior to taking action or undertaking any activity that will significantly or uniquely affect the tribes' access to or use of fish, wildlife, or habitat. The DOI MMS, before proceeding with an oil and gas leas sale or approving an OCS plan, consults with federally-recognized tribes consistent with Government-to-Government consultation and coordination requirements.

The conclusion that Alternative 1 may result in negative impacts to subsistence resources and subsistence lifestyle is based on the cumulative effects of the above changes. Subsistence resources under Alternative 1 may receive a reduced level of identification, priority, and protection by the districts. However, other federal and State agencies are required and do take subsistence into consideration as part of their planning and permitting processes, and this would serve as a mitigating factor.

7.4.6.2 Alternatives 2 and 3 – Effects of No ACMP

Alternatives 2 and 3 would likely have negative impacts on the subsistence resources and subsistence lifestyle. The State and districts would no longer have a coastal program and plans, and they would be unable to designate any subsistence areas or apply subsistence policies in the coastal zone for federal or State consistency purposes. The result could be a reduction in protection for subsistence resources, which would in turn have a negative impact on subsistence lifestyles. However, this would be mitigated somewhat by the continued application of other federal and State agency subsistence requirements.

7.4.7 11 AAC 112.300 Resources and Habitats

The State made several changes to the habitat standards. The most comprehensive change was the removal of the previous introductory language to the habitat section requiring that each type of habitat be managed to "maintain or enhance the biological, physical, and chemical characteristics of the habitat which contribute to its capacity to support living resources." The State rewrote the standard for each habitat type such that it will now be managed for a more specific range of habitat values. Only two types of habitat (rocky islands and seacliffs, and barrier islands and lagoons) continue to include biological considerations. In addition, the State included the opportunity for either districts or the State to designate "important habitat," which can be managed to "avoid, minimize, or mitigate significant adverse impacts to the special productivity of the habitat." Section 5.3.2.12 provides a full description of the changes that were made to the eight habitat areas: offshore areas; estuaries, wetlands, tideflats, rocky island and seacliffs, barrier

islands and lagoons; exposed high-energy coasts; and rivers, lakes and streams, as well as the new standard for designating "important habitat."

As part of the overall amendments to the ACMP, the State is placing emphasis on other existing State resource agencies' authorities and their coverage of habitat management, including the components of habitats that contribute to biological productivity. Those State resource agency authorities are applicable throughout Alaska. Other authorities the State will be relying on include:

- 18 AAC 70, the State's Water Quality Standards, which require providing a level of water quality necessary to protect existing uses that must be maintained to support and protect the growth and reproduction of fish, shellfish, other aquatic life, and wildlife for both fresh and marine water. Standards must be met for a series of pollutants, including color, fecal coliform, bacteria, dissolved gas, dissolved inorganic substances, petroleum, hydrocarbons, oils and grease, pH, radioactivity, residues (floating solids, debris, sludge, deposits, foam and scum), sediment temperature, toxics, and turbidity). These standards are enforced by DEC, and will be handled separately through the DEC permits, which in and of themselves will represent consistency with the ACMP.

- Alaska Statute 41.14.840 (Fishway Act) requires that an individual or government agency notify and obtain authorization from DNR OHMP for activities within or across a stream used by fish if the OHMP determines that such uses or activities could represent an impediment to the efficient passage of fish. For example, culvert installation, water withdrawals; stream realignment or diversion; dams; low-water crossings; and construction, placement, deposition, or removal of any material or structure below ordinary high water all require OHMP approval.

- Alaska Statute 41.14.870 (Anadromous Fish Act) requires that an individual or government agency provide prior notification and obtain permit approval from the OHMP "to construct a hydraulic project or use, divert, obstruct, pollute, or change the natural flow or bed" of a specified waterbody (AS 41.14.870(b)). All activities within or across a specified anadromous waterbody and all instream activities affecting a specified anadromous waterbody require approval from the OHMP, including construction; road crossings, gravel removal; mining, water withdrawals; the use of vehicles or equipment in the waterway; stream realignment or diversion; bank stabilization; blasting; and the placement, excavation, deposition, or removal of any material. Some common activities which require a Fish Habitat Permit include stream fords, heavy equipment operated on the ice, water withdrawal, boat launch and dock construction, and culvert placement. Common activities which do not usually require a permit are hand mining, beaver dam removal by hand, and operation of light vehicles on the ice; however requirements for streambank or streambed disturbance need to be considered.

Other State agencies also require authorization for certain activities in waterbodies that take into consideration habitat issues including the Division of Mining, Land and Water and the ADFG. For offshore mining projects, 11 ACC 86.500, the director of DNR prepares a written finding that considers fish and wildlife species and their habitats in the application area, and the current and projected uses in the application area, including uses and value of fish and wildlife, among other factors. Water Use Permits under 11 AAC 93 contain general requirements to protect fish and wildlife habitat affected by water uses. The commissioner issues certificates of appropriation to the permit holder for the quantity of water that takes into consideration conditions to maintain a specific quantity of water at a given point on a stream or waterbody, or in a specified stretch of stream, throughout the year or for specified times of the year to achieve, among other things, the protection of fish and wildlife habitat. Tideland use permits (11 AAC 96) describe policies for low intensity uses of tidelands, including general conditions that activities must be conducted in a manner that minimizes "disturbance of vegetation, soil stability, or drainage systems; changing the character of, polluting, or introducing silt and sediment into streams, lakes, ponds, water holes, seeps, and marshes; and disturbance of fish and wildlife resources."

In addition to State protection, certain activities within waterbodies may also require additional authorizations from federal agencies, including the U.S. Army Corps of Engineers, U.S. EPA, and U.S. Forest Service.

The State recognizes the value of certain habitats within its vast coastal area, which it has listed. The State standards at 11 AAC 112.300 supplement those State resource agency authorities, and provide enhanced and increased habitat management for those uses and

resources of the coastal zone. Each of the standards contributes to the comprehensive management of elements of the habitat resources. Within the habitat standard itself, the State is further managing certain habitat types, and specifically addressing those characteristics of the habitat they feel are necessary, and are not covered by other authorities.

In addition, to account for any resource that may not be adequately addressed through other State laws, regulations, and the ACMP standards, as well as federal laws, the State has built into the ACMP the ability to designate "important habitats" on a case-by-case basis during a project's consistency review. Important habitats are part of the habitat standard, and bolster the general habitat standard by managing those "important habitats" to "avoid, minimize, or mitigate significant adverse impacts of the special productivity of the habitat." In addition, coastal districts and the State can identify habitats that are of local importance and significance (i.e., a matter of local concern), and develop additional enforceable policies to further manage those habitats.

7.4.7.1 Alternative 1 – Effects of Program Change

Alternative 1 may have a neutral effect on Alaska's resources and habitat, depending on how the designation of "important habitats" is ultimately implemented. Alaska's program amendment submission demonstrates that the State has sufficient statewide regulatory coverage of its resources and habitat. OCRM's greatest interest in reviewing and approving the revised ACMP habitat standard has been to establish if the existing Alaska statutes and regulations, when combined with the new ACMP habitat standards would provide a comprehensive and specific set of enforceable policies to protect the habitat values of the important coastal marine resources the State has identified, including wetlands, tidelands, estuaries, barrier islands, and beaches. As described above, the State has established a comprehensive management scheme for coastal habitat. However, the complex process required for designating an "important habitat," as well as its "district-by-district" approach which does not take into consideration widely established ecosystem approach to habitat management are negatively contributing factors to Alternative 1.

7.4.7.2 Alternatives 2 and 3 – Effects of No ACMP

Alternatives 2 and 3 would likely have negative impacts on the Alaska's coastal resources and habitat. The State and districts would no longer have a coastal program and plans, and they would be unable to designate any "important habitat" areas or apply habitat policies for offshore areas; estuaries, wetlands, tideflats, rocky island and seacliffs, barrier islands and lagoons; exposed high-energy coasts; and rivers, lakes and streams for federal or State consistency purposes. Insomuch as the State is relying in large part on existing State statutes and regulations to protect coastal resources, there would be a neutral effect. Districts in particular would lose the opportunity to negotiate on federal projects with respect to habitat issues, which are of particular interest to them due to mining and oil and gas activities on federal lands.

7.4.8 Removal of "Important Upland Habitat"

The State has removed "important upland habitat" as one of the habitats in the coastal area which is subject to the ACMP. However, the ACMP still addresses upland habitat, which is defined at 6 AAC 80.900(15) as "drainages, aquifers, and land, the use of which would have a direct and significant impact on coastal water."

7.4.8.1 Alternative 1 – Effects of Program Change

Alternative 1 would have a neutral effect on important upland habitat. Under the ACMP amendments, districts still have the ability to address important upland habitat through the designation of important habitats in uplands. An "important habitat" is a portion or portions of the seven habitats listed in 11 AAC 112.300(c), that are either designated as an important habitat by DNR or the district, or identified as State game refuges, State game sanctuaries, State range areas, or fish and game critical habitat areas under AS 16.20. Therefore, if a use of a portion of a river, for example, has a direct and significant impact on coastal waters and can be shown to be biologically and significantly productive, then the habitat can be designated as "important habitat" by the district, even if that portion of the river is significantly upland.

7.4.8.2 Alternatives 2 and 3 – Effects of No ACMP

Alternatives 2 and 3 would have negative impacts on important upland habitat because it is through the ACMP that the State can apply its policies upstream of coastal waters.

7.5 HB 191, 11 AAC 114 – District Plan Guidance

This section discusses the effects related to changes to the government process, the ACMP structure, and State and district roles in the ACMP, as discussed in section 5.3.3, supra. These changes do affect the ability of districts to participate in the ACMP. They include dissolution of the CPC, transfer of the lead agency function from the DGC to the DNR, and a reduction in the scope and breadth of enforceable policies that districts can include in their programs. However, while some of these changes may have significant socio-economic impacts, there is no requirement in the CZMA that a State must rely on local government implementation. Therefore, if a coastal State that has a local government component wants to increase or diminish that local involvement, it may do so, as long as the State continues to meet the requirements for having the organization and authorities to manage its coastal zone.

7.5.1 Government Process (11 AAC 114.010 – 11 AAC 114.020)

Under EO 106 and HB 191, the ACMP was relocated from the Division of Governmental Coordination in the Governor's Office into the OPMP within the DNR, and the CPC was dissolved. The role of the CPC was to provide policy-level leadership for the ACMP, and to serve as the main coordination mechanism for the ACMP, as well as the repository of most of the authority for the program. Since the ACMP was originally intended to be based on both

State agency and local authorities, the CPC membership was composed of representatives of both groups. There were nine elected local government officials and seven State agency heads on the Council. The Council was responsible for adopting the ACMP regulations, supporting resolutions, participating and advising the development of grant applications for federal funding to support the ACMP, reviewing and approving district programs, and providing general leadership for the ACMP. In addition, the CPC served as a forum for resolution of disputes that might arise between stage agencies and local governments on local program implementation, and played a conflict resolution role in inter-agency conflicts when possible. These responsibilities have now been transferred to the DNR. While there continues to be public notice and opportunity for input during public comment and public hearing procedures, there is no longer the same level of participation and local representation at the policy and decision-making level on development of State coastal program standards and guidance, nor approval of district plans.

7.5.1.1 Alternative 1 – Effects of Program Change

Alternative 1 will likely have a neutral effect on the physical environment, however, it may have a negative effect on elements of the socio-economic environment. The change in the lead agency for the ACMP alone is unlikely to result in any negative effects to the coastal resources. However, the State has dissolved the CPC, which provided local government interaction at the top decision-making level of the ACMP. While there is nothing in the federal CZMA or regulations requiring local participation at this level, the sudden removal of this interaction has evoked a strong negative response from the local governments (*See* scoping report, Appendix B). With the dissolution of the CPC, each district now works individually and directly with OPMP

and the DNR Commissioner's Office on the development of that district's coastal policy standards, plan approval, and appeals.

The effects of the proposed shift from considerable local participation in the coastal resources decision-making process to no substantive "official" role are not yet tangible. While the State is required to afford local governments "due deference" in the consistency review process, this clearly different from an officially-recognized role on the CPC. Eventually, local governments may seek opportunities to regain some of their responsibilities. For example, boroughs with title 29 authorities may develop zoning and land use regulations that conflict with the ACMP policies, which would contribute to greater uncertainty for applicants in the overall permitting process.

7.5.1.2 Alternatives 2 and 3 – Effects of No ACMP

Since the ACMP would cease to exist as a matter of State law under either alternative 2 or 3, lead responsibility for the ACMP would cease to exist, as would district involvement through a federally approved ACMP.

7.5.2 District Plan Elements (11 AAC 114.200 – 11 AAC 114.290)

Many of the new requirements regarding content and purview of the district plans will result in a plan development process that appears to be more complicated and cumbersome. A description of all of the changes is provided in section 5.1.3.2 above, as well as in the State's program submission in Appendix C.

7.5.2.1 Alternative 1 – Effects of Program Change

Alternative 1 is likely to result in neutral effects to the physical environment. However, there are likely to be positive and negative effects to the socio-economic environment. In terms of positive effects, the purpose of the new guidelines for district plans is to improve the overall efficiency of ACMP operations and to address the need for clarity, predictability, and flexibility in the ACMP's decision-making process. Applicants for permits that must undergo ACMP State and federal consistency review will benefit from the streamlined process both in terms of time and money saved in the overall process due to a lack of conflicting policies.

There are currently 35 coastal districts; 33 of which have district programs. At this point, 27 districts are reviewing and updating their plans according to the new requirements at 11 AAC 114.200 – 11 AAC 114.290; six are not. These include the City of Angoon, Bristol Bay Borough, City of Hydaburg, City of Kake, City of Kluwok, and the City of St. Paul. According to DNR, none of these six districts have been particularly active participants during the past five years, or received ACMP funds. Therefore, if the revision of the plan guidance is a factor in their decision not to participate, their lack of participation should not result in effects one way or the other. In either case, under Alternative 1, State coastal policies will continue to apply in areas

where district plans are not in place, including State designation of subsistence areas and important habitat areas.

For the remaining 27 districts that are in the process of reviewing and updating their plans, the State has decided that the plan elements established in 11 AAC 114.200 – 11 AAC 114.290 are the most appropriate approach for enacting HB 191. The effect of this process will most likely be the adoption of new district plans with considerably fewer district-level enforceable policies. At this point, districts are in the process of developing draft plans and submitting them to DNR for approval. According to scoping comments, the effect has been that the districts have found the new plan guidance difficult to work with, unclear, time and resource-intensive, and confusing. Specifically, commenters have mentioned conflicting guidance such as being required to write district policies that "flow from" existing State policies, while at the same time being unable to write policies for issues that are already sufficiently covered by State and federal law. Several of the commenters have expressed concern about the time frame for completing the process, even with the extension, and their inability to appropriately involve the public in the process. In addition, districts that have received comments on their draft policies have expressed concern that it is very difficult to write an approvable enforceable policy under the new guidelines. It is also likely to be an expensive process for both the State and local governments. While a reduced role for local governments in review of permitted activities that involve local resources, and a more restrictive, time, human-resource, and effort-intensive

process for developing local plans are not approvability matters under the CZMA, they can be considered negative impacts to the socio-economic environment.

7.5.2.2 Alternatives 2 and 3 – Effects of No ACMP

Alternatives 2 and 3 can not be analyzed, since the ACMP would cease to exist as a matter of State law under either of these alternatives, and there would be no district plan guidance.

7.5.3 Special Area Management Plans and Areas Which Merit Special Attention (11 AAC 114.400 – 11 AAAC 114.430)

Since its inception, the ACMP has included additional management tools that can be used by district and State agencies to focus management efforts in certain areas that "have unique values or fragile characteristics that make them on balance, more in need of special attention." (Appendix C, Section 7.1). In Alaska, these are known as Special Area Management Plans (SAMPs) and Areas which Merit Special Attention (or Areas Meriting Special Attention—AMSAs). AMSAs under the original program included those AMSAs located within the coastal district, and those outside of the coastal districts (a.k.a. extraterritorial or ET AMSAs). This is not changed by the proposed amendments. These programs were developed with procedures similar to the approval of a district program or as an amendment to the ACMP, the goal of which was to develop a plan that would "preserve, protect, enhance, or restore each value for which the area was designated." The purpose of SAMPs is to "provide for increased specificity in protecting significant natural resources, coastal-dependent economic growth, improved protection of life and property in hazardous areas, and improved predictability in governmental decision making." SAMPS could include a harbor management plan, an ocean resource management plan, a public use management plan, a recreation management plan, a watershed management plan, and a wetlands management plan. (ACMP Guidebook 4, Special Area Planning, January 2000)

There are currently 33 approved SAMPs and AMSAs in the ACMP. The boundaries for these are included in the Coastal Zone Boundary geographic information system maps available on the ACMP website at www.alaskacoast.state.ak.us. In addition, under AS 16.20, the ADFG has established 30 State game refuges, game sanctuaries, range areas and critical habitat areas. The amendment to the ACMP has increased the ability for participants to identify and designate areas of particular concern in the future through two new means. These are discussed in section 5.1.3.4 above. The development of SAMPs, AMSAs and State agency resource management plans naturally takes a great deal of time, cost, and effort. The ACMP has funded the development of SAMPs by districts and local participants since its inception. However, due to the enormity of the State's coastal area, a comprehensive inventory of all areas of particular concern has not been conducted.

7.5.3.1 Alternative 1 – Effects of Program Change

The first effect of the changes to the ACMP is that all approved SAMPs and AMSAs

developed by district/borough programs would have to be revised according to the procedures described in 11 AAC 114 for district programs, consistent with the new guidance. They would remain in effect until March 1, 2007, unless the DNR disapproves or modifies all or part of the approved plans.

The potential for a number of the AMSAs and SAMPs to sunset (i.e., become non-enforceable) is real if districts find they do not have time or resources to make the changes, or possibly the interest in doing so. During the scoping process, several issues were raised by local representatives with the nature of the plan development process regarding the amount of effort required to revise district plans, and as a consequence, some of these AMSAs and SAMPs may now be allowed to lapse. This would not preclude local governments from developing new plans in the future when circumstances are more favorable (i.e., time, funding). However, every indication is that most of the coastal districts are making every effort to meet the new requirements. Most draft district programs that are in the process of being developed include the relevant provisions of the SAMPs built into their coastal district programs. For example, see the draft City of Skagway Coastal Management Plan that includes all four of their AMSAs at http://www.alaskacoast.state.ak.us/District/Plans/Skagway.htm. One of the aspects of these plans that is changing is the number of enforceable policies that are included under the old plans vs. the new ones being developed. A review of the City of Cordova's Eyak Lake AMSA (dated 11/24/86) lists 39 enforceable policies. The draft version (Chapter 6 of the draft Coastal Management Program) shows only 24 enforceable policies, indicating the impact of the revised approval criteria and process.

Another change associated with the provisions of the AMSAs and SAMPs is the fact that plans developed for designated areas that were once approved by the CPC, now will be approved by the OPMP/Commissioner of DNR. This is the State's preference as indicated by legislation but represents a paradigm shift. The impacts associated with the difference in decision making capabilities are discussed elsewhere in this EIS.

The AMSA and SAMP process and future designated areas will remain a potentially powerful tool for Alaska to provide the resources necessary to focus planning and management efforts to specifically defined areas in a State with the largest, least-populated coastline in the United States. The very purpose of designating these areas that merit special attention is to preserve and protect them, and that will provide environmental protection while dealing in an appropriate manner with future development scenarios and needs. Many of the approved AMSA and SAMP designations deal with the important but difficult issues of subsistence but require a process that results in greater specificity of interests, and that is one of the goals of the current amendment process. The SAMP process should remain an important incentive for coastal district and coastal resource area governments to participate. Federal funding to support program development, refinement, and revisions should have a positive effect for the resources in question.

7.5.3.2 Alternatives 2 and 3 – Effects of No ACMP

Should either Alternative 2 or 3 lead to the demise of the ACMP or the lack of federal funding for the ACMP, it is unlikely that the coastal district programs would have financial support to develop future AMSA or SAMP-like programs. Also, those local governments lacking Title 29 authorities would likely be unable to continue to have AMSAs or SAMPs without an existing State coastal management program. This is more than an issue of applying federal consistency to give local governments more say in major development projects or activities in their areas of responsibility. Special area plan support has provided funds to local governments to conduct resource inventories and analyses to better understand the fragility of an area, the potential impacts of uses including small scale developments and their cumulative impacts, and future development needs and location issues. While it has varied over time, the ACMP in the past has provided nearly $500,000 to $1,000,000 annually of CZMA funds to support local planning efforts. This would likely result in some negative effects to the natural environment, which would no longer receive the protection afforded special management area status.

7.6 HB 69 – Shallow Natural Gas Exploration and Development

Under HB 69, the State developed a new framework for addressing shallow natural gas development. The term "shallow natural gas" includes coal bed methane, fractured shales, and gas hydrates found at any depth. HB 69 was created in response to public comments that shallow natural gas exploration and development projects should not be subject to the same regulations designed for deep, high-pressure oil and gas operations. The State's rationale for developing this framework is that shallow natural gas exploration and development activities defined in HB 69 are considered de minimis in nature and pose significantly fewer risks and create substantially less impact to the environment than traditional deep oil and gas projects.

7.6.1 Alternative 1 – Effects of Program Change

7.6.1.1 Variance from Mining Regulations

The addition of AS 31.05.060(c), authorizing AOGCC to approve variances from AOGCC's regulations for certain shallow natural gas exploration or development actions may result in a negative impact to the physical environment. Prior to HB 69, shallow natural gas exploration or development actions were generally subject to AOGCC's regulations that included various environmental and safety controls on drilling operations, production procedures, and abandonment and plugging of wells. The addition of AS 31.05.060(c) under HB 69 could have a negative impact on the physical environment because it allows shallow natural gas exploration or development actions to occur without complying with the environmental and safety requirements of the AOGCC regulations.

A potential mitigating factor is that the AOGCC cannot approve a variance unless it is an equally effective means of satisfying the AOGCC regulations or the AOGCC determines the variance is more appropriate than compliance with AOGCC regulations. Also, the AOGCC variance may exempt a lessee or operator from a requirement of an AOGCC regulation only if

the AOGCC determines the requirement is not necessary or not suited for the well or field. In making this determination, the AOGCC must consider the human safety and the environmental risks reasonably anticipated to occur from the exemption to the AOGCC regulation.

The addition of AS 31.05.060(c) may also result in socio-economic impacts. Prior to HB 69, AOGCC was authorized to issue an order that would prevail over AOGCC regulations as long as the public hearing requirements of 20 AAC 25.540 were satisfied. The addition of AS 31.05.060(c) under HB 69 allows AOGCC to approve a variance to AOGCC regulations without providing notice to the public and an opportunity to be heard. Therefore, it is likely that HB 69 would have an impact on public participation in the government decision-making process because the AOGCC could approve a variance to AOGCC regulations without providing notice to the public and opportunities for the public to comment. The addition of AS 31.05.060(c) may have a positive economic impact because it could encourage shallow natural gas development that might have otherwise been unduly delayed by AOGCC regulations.

7.6.1.2 Waiver from Local Ordinances and Regulations

AS 31.05.125 authorizes the DNR commissioner to approve a waiver of the planning and approval requirements of local ordinances and regulations for shallow natural gas projects. Prior to HB 69, shallow natural gas exploration or development actions were subject to local ordinances and regulations. AS 31.05.125 could limit a municipality's Title 29 authority to apply local zoning ordinances and regulations to shallow natural gas projects. The addition of the waiver in AS 31.05.125 under HB 69 could have a negative impact on the physical environment because it allows shallow natural gas exploration or development actions to occur without complying with the environmental and safety requirements of local ordinances and regulations. A potential mitigating factor is that the DNR commissioner must clearly demonstrate that there is an overriding State interest and issue specific findings giving reasons for granting a waiver of local ordinances and regulations for shallow natural gas projects.

The addition of AS 31.05.125 may have a positive economic impact because it could encourage shallow natural gas development that might have otherwise been unduly delayed by local ordinances or regulations.

7.6.1.3 Exemption for Production Facilities

The amendment of AS 46.04.030(b), exempts shallow natural gas production facilities from obtaining DEC approval of, and compliance with, an oil discharge prevention and contingency plan. Prior to HB 69, shallow natural gas production facilities were required to comply with a DEC-approved oil discharge prevention and contingency plan. Allowing shallow natural gas production facilities such an exemption may have a negative impact on the physical environment if a shallow natural gas production facility penetrated a formation capable of flowing oil and the facility did not have an approved discharge prevention and contingency plan. Since the definition of the term "shallow natural gas" under AS 31.05.170 includes coal bed methane, fractured shales, and gas hydrates sought at any depth it is possible that shallow natural gas production facilities could penetrate a formation capable of flowing oil.

A potential mitigating factor is that under AS 31.05.030(j), the AOGCC is required to determine whether a well drilled for shallow natural gas may penetrate a formation capable of flowing oil. If so, the AOGCC must also determine whether the volume of oil to be encountered will be of such quantity that an oil discharge prevention and contingency plan will be required.

The amendment of AS 46.04.030(b) may have a positive economic impact because it could encourage shallow natural gas development that might have otherwise been unduly delayed by the requirement to comply with a DEC-approved oil discharge prevention and contingency plan.

7.6.1.4 Consistency

Under HB 69, the addition of AS 46.40.205 provides that all shallow natural gas exploration and development activities conducted under the oversight and regulation of the AOGCC and the State's resource agencies are automatically determined to be consistent with the ACMP. According to the State, this consistency determination applies throughout the coastal zone and specifically to those areas in the coastal area that have valuable and developable coal deposits that may yield natural gas. Prior to HB 69, shallow natural gas exploration and development activities in the coastal area requiring a federal license or permit had to meet the State's standard federal consistency review requirements.

It is not apparent at this point whether the addition of AS 46.40.205 will significantly affect the human environment. Prior to HB 69, shallow natural gas projects were subject to review for State or federal consistency with the enforceable policies of the ACMP including and other resource agency regulations. However, it is difficult to determine whether any projects fitting under the HB 69 criteria for shallow natural gas projects were reviewed for consistency. The addition of AS 46.40.205 may have an environmental impact if shallow natural gas projects were previously reviewed for consistency because under AS 46.40.205 there will no longer be a review of whether shallow natural gas projects are consistent with the enforceable policies of the ACMP. However, if the State did not review shallow natural gas activities prior to HB 69 because such projects were determined to be de minimis activities the general concurrence for such projects established by AS 46.40.205 for purposes of the CZMA may not result in significant impacts to the human environment.

The addition of AS 46.40.205 may have socio-economic impacts. Prior to HB 69, the public was offered an opportunity to participate in the government decision-making process through State and federal consistency. The addition of AS 46.40.205 may have a negative impact on public participation in the government decision-making process because by automatically determining that shallow natural gas projects are consistent with the ACMP there would be one less opportunity for public participation. However, a potential mitigating factor is that there are public review and comment processes provided under AOGCC and other State resource agency regulations. Therefore, unless AOGCC approves a variance to its public notice and comment requirements as described in 5.3.1 above, there will still be a public review process

in place for shallow natural gas projects.

The addition of AS 46.40.205 may have a positive economic impact because there could be timelier and more efficient review of shallow natural gas exploration and development since a federal consistency review is not required.

7.6.2 Alternatives 2 and 3 – Effects of No ACMP

Under Alternatives 2 and 3, impacts could occur as described in section 7.3.2 above, because under Alternatives 2 and 3 there will no longer be an existing ACMP.

8. ENVIRONMENTAL JUSTICE

NOAA is required under Executive Order (EO) 12898, entitled *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, to analyze the environmental effects (health, economic and social) of proposed actions, including such effects on minority and low-income communities, when such analysis is required by NEPA. On February 11, 1994, President Clinton issued Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (59 FR 7629). This EO, along with its accompanying cover memo, calls on federal agencies to incorporate environmental justice considerations as part of their missions. It directs them to address, as appropriate, the disproportionately high and adverse human health or environmental effects of their actions, programs, or policies on minority and low income populations. The cover memo specifically mentions the NEPA twice, providing opportunities to incorporate environmental
justice as part of the NEPA process. The fundamental objective of the Executive Order is summarized in its first section, which states:

> To the greatest extent practicable and permitted by law...each federal agency shall make achieving environmental justice a part of its mission by identifying and addressing disproportionately high adverse human health or environmental effects of its programs, policies and activities on minority and low-income populations in the United States.

In addition, Section 4-4 of Executive Order 12898 identifies subsistence issues as a particular concern for environmental justice populations, since these populations frequently rely on food that they grow, hunt, collect, or otherwise obtain through noncommercial means. Therefore, as part of its NEPA analysis, NOAA must consider whether approval of the Alaska Program Amendment will have disproportionately high adverse health, economic or social impacts on minority and low-income populations in Alaska.

This FEIS used data from the 2000 census and the Alaska Community Database Community Information Summaries at http://www.commerce.state.ak.us/dca/commdb/CIS.cfm to evaluate the environmental justice implications of all three alternatives.

8.1 Minority Populations in Alaska's Coastal Area

Council on Environmental Quality guidelines developed for Executive Order 12898 recommend that "minority" be defined as members of American Indian or Alaska Native, Asian or Pacific Islander, Black non-Hispanic, and Hispanic populations (CEQ 1997). The earliest release of detailed 2000 census data that included information necessary to identify minority populations enumerated individuals both according to race and Hispanic origin (U.S. Bureau of the Census 2001a). It also reported individuals claiming multiple racial identities, up to six races. For simplification's sake, in this document the term "minority populations" will refer to American Indian or Native Alaskan, which in the 2000 census included persons who identified themselves as part-Native Alaskan or American Indian.

To identify disproportionately high minority populations, due to the location of the program change this EIS uses the percentage of Native Alaskans and American Indians for the State of Alaska as a reference point. Block groups or communities with minority populations in excess of the percentage for the State as a whole thus are identified as disproportionately high with respect to their minority composition. Using the entire State's minority population to identify disproportionality acknowledges the unique minority situation in Alaska's coastal area compared with statewide, since the majority of the population (75 percent) resides in the coastal area (with its comparatively high population of indigenous people), as well as the disproportionate potential for impacts on minority population by approval of the ACMP revisions. In 2000, 19 percent of the State population was Native Alaskan or American Indian alone or in combination. (U.S. Bureau of the Census 2001b).

CHART C: POPULATION,POVERTY LEVEL, &SUBSISTENCE FOR COASTAL COMMUNITIES BELOW POPULATION OF 2,000*

</= 100 Population			</= 300 Population			</= 500 Population			</= 750 Population			</= 1000 Population			</= 2000 Population +		
% Native AK	% Below Poverty Level	Subsis-tence?	% Native AK	% Below Poverty Level	Subsis-tence	% Native AK	% Below Poverty Level	Subsis-tence	% Native AK	% Below Poverty Level	Subsis-tence	% Native AK	% Below Poverty Level	Subsis-tence	% Native AK	% Below Poverty Level	Subsis-tence
91.3	7.53	Y	37.3	4.66	N	95.1	30.94	Y	96.4	21.16	Y	16.4	45.48	Y	30.9	9.84	Y
4	20	N	86.7	14.29	Y	92	48.36	Y	97.9	33.84	Y	95.9	29.49	Y	95.8	27.94	Y
77.9	15.58	Y	95.9	30.28	Y	96.8	11.92	Y	86.4	27.92	Y	93.9	16.24	Y	89.7	8.01	Y
60.8	4.49	Y	87.6	21.97	Y	98	25.07	Y	73.3	14.04	Y	58.1	14.25	Y			
82.5	1.8	Y	6	4.85	N	94.9	7.87	Y	95.8	28.47	Y	94.8	29.52	Y			
17	27.27	N	94.1	5.76	Y	95.8	28.47	Y	74.6	14.61	Y	44.2	16.03	Y			
4.1	23.08	X	93.8	35.44	Y	89.5	24.12	Y	96.7	22.75	Y	95.5	29.06	Y			
76.7	6.9	Y	96.8	28.85	Y	92.8	11.24	Y	47.9	11.93	Y	95.3	34.38	Y			
0	5.56	N	92.4	4.35	Y	96.6	26.4	Y	98	20.89	Y						
0	25	N	93.9	38.98	Y	97.2	13.77	Y	96.1	21.12	Y						
83	6.9	Y	9.4	9.29	N	97.9	34.7	Y	93.5	22.19	Y						
57.8	3.1	Y	88.5	1.53	Y	97.7	28.6	Y	94	7.57	Y						
95.5	0	Y	93.6	28.57	Y	96.6	20.18	Y	97.6	28.73	Y						
48.7	0	X	90.8	42.61	Y	98.2	20.23	Y	97.3	26.1	Y						
0	0	Y	87.4	19.31	Y	96.9	30.99	Y	94.5	16.27	Y						
95.1	24.55	Y	95.5	40.63	Y	96	22.04	Y	87.6	20.41	Y						
9.5	0	Y	96.7	21.88	Y	95.9	20.73	Y	86.5	11.87	Y						
81.9	6.41	Y	9.6	9.45	N	93.9	21.77	Y	94.7	41.88	Y						
69.2	20.69	Y	91.3	16.3	Y	97.4	37.36	Y	97.6	27.33	Y						
100	40	Y	94.7	10.7	Y	94.5	35.79	Y	87.7	11.04	Y						
64	6	Y	90	45.41	Y	93.2	22.88	Y									
86	20.83	Y	25.8	4.73	N	4.8	7.81	Y									
92.7	22	Y	98.1	16	Y	94.2	27.85	Y									
8.6	4.88	Y	93.6	32.23	Y	98.9	23.03	Y									
13.6	22.9	Y	22.1	6	N	96.9	30.77	Y									
0	5.98	N	94.8	6.09	Y												
78.2	5.6	Y	92.1	7.86	Y												
11.1	57.5	Y	85	24.21	Y												
0	0	N	30.2	8.11	Y												
11.1	0	N	92.5	37.7	Y												
81.8	10	Y	4.8	11.76	N												
3.4	0	Y	90.1	18.3	Y												
			86.2	22.38	y												
			12.6	7.1	N												

CHART D: NATIVE ALASKA POPULATION, POVERTY LEVEL, AND SUBSISTENCE FOR COASTAL BOROUGHS*

Borough	Population	% Native Alaskan	% Below Poverty Level	Subsistence?
Anchorage	274,003	10.4	7.4	No
Bethel Census Area	16,774	85.5	20.6	Yes
Bristol Bay Borough	1,105	36	9.5	No
Dillingham Census Area	4,912	76.2	24.4	Yes
Haines Borough	2,327	15.6	11.7	No
Juneau	31,283	16.6	6	No
Kenai Peninsula Borough	50,980	10.2	10.04	Yes
Ketchikan-Gateway Borough	13,548	19.1	6.5	No
Kodiak	13,811	17.6	6.6	Yes
Mat-Su Borough	67,473	8.6	11	No
Nome Census Area	9,370	79.1	17.4	Yes
North Slope Borough	7,234	73.8	9.1	Yes
Sitka	8,891	24.7	12.8	Yes
Skagway-Hoonah-Angoon	3,164	39.5	12.8	No
Valdez-Cordova	10,230	17.3	9.8	No
Wrangell-Petersburg	6,336	22.6	7.9	Yes
Yakutat	691	46.8	13.5	Yes

*Information for these charts was gathered from the Alaska Community Database Community Information http://www.commerce.state.ak.us/dca/commdb/CIS.cfm. Population is based on 2004 information; other information from that site is gathered from the 2000 Census. The list of individual communities and boroughs and census areas located in the coastal area is based on an Index of Coastal Communities provided by the Alaska DNR. Individual communities not listed are represented within a Borough or Census area, with the exception of Cape Pole, Cape Yakataga, Dora Bay, Funter Bay, Hawkins Island, Hinchinbrook Island, Kuiu Island, Labouchere Bay, Long Island, Polk Inlet, Port Armstrong, Rown Bay, Sawmill Bay, Security Bay, Tolstoi Bay, Two Moons Bay, and Unakwik Inlet.

As demonstrated in Charts C and D, of the 122 small coastal or rural/remote rural communities with less than 2,000 residents, 101 have greater than the 19 percent minority Native Alaskan and American Indian populations. In fact, 65 of those communities have between 90 and 100 percent Native Alaskan and American Indian populations, with another 18 having between 80 and 90 percent Native Alaskan and American Indian populations. The remaining 18 communities have between 20 and 80 percent minority populations. With respect to the larger borough and population centers (representing populations between 2,327 and 274,003, (with the exceptions of Yakutat at 691 and Bristol Bay Borough at 1,105), nine of these 17 areas have greater than the 19 percent minority population. However, these figures range much lower, with only three areas, Bethel Census Area (85.5 percent), Dillingham Census Area (76.2 percent), Nome Census Area (79.1 percent), and North Slope Borough (73.8 percent) having substantially larger minority populations. Areas where the minority population is lower than the statewide average are Anchorage, Haines Borough, Juneau, Kenai Peninsula Borough, Kodiak, Mat-Su Borough, and Valdez-Cordova.

8.2 Low Income Populations in Alaska's Coastal Area

As recommended by the CEQ guidelines, this environmental justice analysis identifies low income populations as those falling below the statistical poverty level identified annually by the U.S. Bureau of the Census in its Series P-60 on income and poverty. The Census Bureau defines poverty levels on the basis of a statistical threshold that considers for each family both overall family size and the number of related children less than 18 years old. For example, the poverty threshold annual income for a family of three with one related child under 18 was $13,410, while the poverty threshold for a family of five with one related child under 18 years was $21,024 in 1999 (U.S. Bureau of the Census 2000). The 2000 census used 1999 thresholds because 1999 was the most recent year for which annual income data were available when the census was conducted. If a family fell below the poverty line for its particular composition, the census considered all individuals in that family to be below the poverty line. To identify census block groups with disproportionately high presence of low-income populations, this EIS used the percentage of low-income persons living in the State of Alaska as a reference point. The rationale for using State-level statistics to define disproportionality low-income populations was that the coastal area encompasses portions of the entire State and represents 75 percent of the population, and consequently, requires reference to an equally broad range of economic settings. In 1999, 9.4 percent of the State population was low-income, as defined on the basis of the criteria outlined above (U.S. Bureau of the Census 1992).

The number of low-income population living in the coastal area is also substantially higher than the State average, particularly in the rural and remote rural coastal communities. According to the Status of Alaska Natives 2004 report published by the University of Alaska Institute of Social and Economic Research, Native Alaskans are three times as likely as other Alaskans to be poor. In addition, all the economic problems Native Alaskans face are worst in remote areas, where living costs are highest. As demonstrated in Charts C and D, of the 122 small, or rural/remote rural coastal communities, 82 communities, or 67 percent, have a higher percentage of the population living below the poverty level, or that could be considered "low income." The basis for these figures, and any ties to the minority Native Alaskan and American

Indian communities are discussed in Section 6.2 above. In the larger population centers in the coastal area, 11 of the 17 boroughs and census areas, or 64 percent have a higher percentage than the State average of population living below the poverty level.

8.3 Subsistence in Alaska's Coastal Area

In addition to ethnic background and income, the other important factor in determining the effect of federal activities in Alaska's coastal areas and their relationship to environmental justice issues is the Native Alaskans' and American Indians', as well as low income community's reliance on subsistence as a source of food, cash and non-cash economy, and community and spiritual tradition. Table 1, as well as Charts C and D reflect whether subsistence activities and resources have been identified as important to coastal communities. It is clear from the table and charts that those communities with the largest number of Native Alaskans and American Indians, as well as low-income communities (in many cases, the same communities), rely the most on subsistence resources. Therefore, any policy changes that specifically and/or negatively target subsistence resources and their governance will have a corresponding effect on communities that are the subject of Environmental Justice reviews.

8.4 Environmental Justice Impacts of Preferred Alternative

Based on the above information and the effects analysis, OCRM's approval of some elements of the ACMP program amendments is likely to have disproportionately high adverse economic and social impacts on minority and low-income populations in Alaska in terms of Native Alaskan communities developing subsistence use policies and designating subsistence use areas.

8.4.1 Economic Impacts

Subsistence fishing and hunting figure prominently in the economy of the majority of Alaska's coastal rural and remote rural areas, which represent a high number of the State's minority and low-income populations. The ADFG, following 15 years of intensive research, concluded that the non-commercial taking of wild plant and animal species for food and other domestic uses continues to produce "significant economic value" in contemporary Alaska, particularly in the rural areas of the State. For example, 45 of 98 communities surveyed by the State during the early 1980s were found to have wild food harvesting equal to or surpassing in quantity the western U.S. standard for average annual per capita purchases of meat, fish, and poultry. Approximately 83 percent of those same 98 communities reached at least half of that western U.S. benchmark through hunting and fishing. (Economic Issues & Rural Economic Development, www.alaskool.org/resources/anc2/ANC2_Sec3.html) These wild foods and materials, if absent, would have to be replaced by imported substitutes at some economic and social cost. The costs would be particularly high for remote rural areas due to the remote locations and lack of public infrastructure to ferry goods to these areas.

Changes to the State's subsistence standards and the district plans may create

circumstances that will result in negative effects to subsistence resources. Under the revised statewide standards, subsistence resources under the preferred alternative may receive a reduced level of identification, priority, and protection by the districts. Districts' ability to designate subsistence use areas and to create subsistence use policies is more limited and they no longer have the "seat at the table" they had under the CPC. Also, districts will no longer have the ability to negotiate with applicants to provide mitigation for any negative impacts to subsistence resources that result from an approved project, no matter how minimal.

8.4.2 Social Impacts

Perhaps the greatest focus and controversy of the proposed ACMP amendments is the new emphasis on State control and, what has been perceived by local governments, a loss of their involvement in critical subsistence resource management. This has been accomplished through legislative and regulatory changes at the State level, which has restructured local participation in management of the ACMP and developed guidance for district plans that narrows the scope of their management abilities over key subsistence areas. This is a decision that has been made by the State, and it is their decision to make under the CZMA. However, by approving the amendment, NOAA is likely to be viewed by some as having taken an action that has disproportionately highly adverse effects on minority and low-income populations' self-government in the State of Alaska.

9. COMPLIANCE WITH OTHER ENVIRONMENTAL AND ADMINISTRATIVE REVIEW REQUIREMENTS

OCRM's action to approve the amendments to the ACMP as described in this EIS is subject to a number of authorities such as the ESA. OCRM is responsible for ensuring federal actions comply with these and other relevant authorities. A brief discussion on how these laws and executive orders are met with this action is described below.

9.1 Endangered Species Act (16 USC 1531 et seq.)

The purpose of the ESA is to protect certain species of plants or animals that have become "listed" as endangered, threatened, and proposed or candidate species and designated critical habitat and to ensure there is no "taking" of the species. Alaska has a number of marine mammals including whales, Steller sea lions, and sea otters; several species of sea birds and a sea duck, and one fern that are listed. The nature of the federal action in this EIS is not approval of a specific project that would directly result in a taking. However, land and water use plans and standards such as those proposed under this amendment, play a role in how growth and development may occur under future scenarios. OCRM has initiated discussion with the USFWS and NMFS to determine the extent of impacts that may be associated with approval of the proposed amendment to the ACMP. (*See* discussion on ESA at 6.1.9). A decision on consistency with the provisions of the ESA will be held in abeyance until discussions and consultation has been completed to the satisfaction of the Services.

9.2 Magnuson-Stevens Fishery Conservation and Management Act

Under the Magnuson-Stevens Fishery Conservation and Management Act, federal agencies are required to consult with NMFS regarding any actions that may adversely affect designated Essential Fish Habitat (EFH). NOAA Fisheries recently published a final EIS on the designation of EFH areas for Alaska (http://www.fakr.NOAA.gov/habitat/seis/efheis.htm). Many of the issues regarding the level of protection needed for EFH concern the effects of fishing activities on sea floor habitats (EFH FEIS). The ACMP does not directly deal with fishery management plans or with EFH far out in the OCS in areas that are regulated by Fishery Management Councils. However, there are many nearshore areas that contain EFH that may be affected by land and water use plans and standards such as those proposed under this amendment. OCRM is consulting with NMFS regarding potential effects to EFH.

9.3 Environmental Justice

See discussion at Section 8 above.

9.4 Executive Order 12866

Implementation of the ACMP does not constitute a "significant regulatory action" as defined by Executive Order 12866 because: (1) it will not have an annual effect on the economy of $100 million or more, or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, on State, local or tribal governments or communities; (2) it will not create a serious inconsistency or otherwise interfere with an action taken or planned by another agency; (3) it will not materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; and (4) it will not raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the Executive Order.

9.5 Executive Order 13084: Consultation and Coordination with Indian Tribal Governments

The federal government has a trust responsibility to American Indian and Native Alaskan Governments in protecting tribal self-determination, tribal autonomy, and the tribal way of life. Actions taken pursuant to the CZMA by OCRM, and Alaska through the federally approved ACMP, may impact Native Alaskan governments. OCRM is, therefore, required to engage in government to government consultation with Native Alaskan governments as part of the review and approval of the ACMP amendment. This requirement is set forth in Executive Order 13084, *Consultation and Coordination with Indian Tribal Governments* (63 Fed. Reg. 27655-27657 (Tuesday, May 9, 1998)); President Clinton's *Memorandum on Government-to-Government Relations With Native American Tribal Governments* (April 29, 1994)(59 Fed. Reg. 22951-22952 (Wednesday, May 4, 1994)); and the *American Indian and Alaska Native Policy of the*

U.S. Department of Commerce (March 30, 1995). OCRM will establish a schedule to meet with Native Alaskan governments during the Fall of 2005.

10. SUMMARY AND CONCLUSIONS

10.1 Summary of Effects

10.1.1 Effects on Physical Resources – Alternative 1

The majority of the changes proposed under the ACMP's program amendment are likely to result in neutral effects to the physical environment, relative to the pre-amendment ACMP. The State has proposed a shift in its program from State and local plan implementation to primarily State implementation using State standards and State law. In response to legislative mandates, the State's coastal standards were rewritten to avoid redundancy with other State statutes, regulations, and programs. Where changes were made to most of the standards, they were made for clarification and to set management guidelines and compliance standards. In some cases, such as the natural hazard standard at 11 AAC 112.210, and the coastal access standard at 11 AAC 112.220, the State has revised the language to be more comprehensive, specific, and enforceable. OCRM's approval of these changes is unlikely to result in either positive or negative effects on the physical environment. However, in such cases as natural hazard areas and coastal access there now appears to be additional coverage for more areas, which may result in positive effects for the physical and socio-economic environment.

In terms of negative effects to the physical environment, there is one major concern. This is the new standards and process requiring designation for subsistence areas will reduce the level of district policies and review for subsistence uses. In addition, the State has removed the ability for districts to seek mitigation for any damages resulting to subsistence areas from permitted activities. These changes have the potential to result in negative effects to subsistence resources.

10.1.2 Effects on Physical Resources – Alternatives 2 and 3

There would be negative effects for physical resources if either alternative two or three were to occur. Under these alternatives, as mentioned previously, the ACMP would sunset, according to State law, and the State would no longer participate in the national program. The result would be the loss of ACMP standards as well as district programs, in addition to the loss of the State's ability to apply federal consistency. It is assumed that the State's other natural resource statutes, regulations and programs would continue to exist, and the State's current proposed reliance on these statutes for protection of its coastal resources would be tested in full. However, except as may be required by other federal laws, federal agencies would no longer be compelled to meet State standards within the coastal area. Considering that 60 percent of Alaska is federal lands, and the amount of federal oil and gas and mining activities that occurs there now and may occur in the future, there is the opportunity for considerable negative effects to Alaska's physical coastal resources under alternatives two or three.

10.1.3 Effects on Socio-Economic Resources – Alternative 1

The socio-economic benefits that the revised ACMP would provide include (1) a more

efficient permitting operation for activities in the coastal area (2) greater clarity and guidance in some of the statewide coastal standards; (3) financial savings and time savings for investors; and (4) and economic benefits to the State from increased investment.

10.1.4 Effects on Socio-Economic Resources – Alternative 2

There would be negative effects for socio-economic resources if either alternative two or three were to occur. Under these alternatives, as mentioned previously, the ACMP would sunset, according to State law, and the State would no longer participate in the national program. The result would be the loss of the ACMP standards as well as district programs, in addition to the loss of the State and districts' ability to apply federal consistency. In addition, Alaska would lose the opportunity to experience the socio-economic benefits described in 10.1.3. above.

10.2 Adverse Effects that Can Not be Avoided

OCRM's approval of the State of Alaska's amendments to its federally-approved coastal management program may affect a variety of physical and socio-economic coastal resources in Alaska. OCRM approval will ensure funding for, and implementation of, the program changes, which include revisions to the district plan process and substance and federal consistency with the revised standards. As indicated in the impacts discussion of this document, there may be some negative physical and socio-economic environmental effects associated with some of the new standards, including changes to the subsistence standard. In addition, changes to the overall implementation of the program from a State and locally-implemented program to a primarily State-implemented program may result in socio-economic impacts due to the ethnic and subsistence-oriented population primarily affected by these changes.

10.3 Conclusions

In 2003, the State of Alaska decided to address structural issues with the ACMP's ability to meet its requirements in a timely manner through a series of legislatives acts and regulatory changes. These changes resulted in the entire restructuring of the ACMP from an entity that shared decision-making authority between State and local governments on coastal resources, to a State-centered program, with input from local governments focused solely on coastal resources determined and demonstrated to be of local concern. In addition, the State streamlined the State's coastal standards to avoid redundancy with other State and federal laws. OCRM's approval of these changes, particularly the significant change to the level of sharing between the local and State governments' decision-making control over subsistence-related resources in the coastal area, was considered to be a major federal action.

However, the actual effect of many of these changes is less significant. While there are instances where there may be negative effects to the physical and socio-economic environment (*See* discussion at section 10.2), the majority of the changes will result in neutral effects. In essence, the State is still implementing its federally-approved ACMP, and relying on existing State laws while avoiding some of the redundancy experienced under the previous program

structure. Positive effects from this may be more consistent reviews and requirements for permitees, a faster and smoother permit processing system, and more even application of new standards that are more compliance and management-oriented standards. Local districts will continue to have review authority for resources of local concern.

Alternatively, if OCRM denies Alaska's request for program amendment, or fails to take action on this request before January 1, 2006, the State has enacted a statute which will repeal the ACMP, which would take effect on May 10, 2006. As mentioned previously, Alaska could, of course, consider changing its laws during the upcoming legislative session; but given existing law, the most likely outcome if OCRM were to fail to act before January 1, 2006, is the repeal and termination of the ACMP. There are adverse effects associated with either of these alternatives.

Therefore, NOAA's preferred alternative is Alternative 1, to approve Alaska's request to incorporate EO 106, HBs 191, 69, 86, SB 102, revisions to statute AS 46, and regulations at 11 AAC110, 11 AAC 112, and 11 AAC 114 as a program amendment to the ACMP.

11. LIST OF AGENCIES AND PERSONS CONSULTED

US Fish and Wildlife Service

NOAA Marine Fisheries Service

U.S. Department of the Interior

Minerals Management Service

12. LIST OF PREPARERS

Helen C. P. Bass
Environmental Protection Specialist
B.A. History
M.A. Marine Affairs
Office of Ocean and Coastal Resource Management
National Ocean Service/NOAA
Phone: 301/713-3155, x175
E-mail: Helen.Bass@noaa.gov

Richard B. "Ben" Mieremet
Senior Program Analyst
B.S. Conservation and Resource Development
M.S. Water Resources Management
M.A. International Relations
Office of Ocean and Coastal Resource Management
National Ocean Service/NOAA
Phone: 301/713-3155, x233
E-mail: Ben.Mieremet@noaa.gov

David Kaiser
Federal Consistency Coordinator
Juris Doctor
M.A. Marine Affairs
B.A. Political Science
Office of Ocean and Coastal Resource Management
National Ocean Service/NOAA
Phone: 301/713-3155, x144
E-mail: David.Kaiser@noaa.gov

Masi Okasaki
Assistant Regional Manager
B.A.
Office of Ocean and Coastal Resource Management
National Ocean Service/NOAA
Phone: 301/713-3155, x231
E-mail: Masi.Okasaki@noaa.gov

13. DISTRIBUTION LIST FOR EIS

Andrew Abyo, President
Native Village of Pilot Point
P.O. Box 449
Pilot Point, AK 99649

Simon Agnus, President
Native Village of Umkumiute
General Delivery
Nighmute, AK 99690

George Ahmaogak Sr., Mayor
North Slope Borough
P.O. Box 69
Barrow, AK 99723

Maggie Ahmaogak, Executive Director
Alaska Eskimo Whaling Commission
P.O. Box 570
Barrow, AK 99723

Edward Adams, Sr., President
Native Village of Chevak
140 Aurora Street
Chevak, AK 99563

James Ayuluk, President
Native Village of Chevak
140 Aurora Street
Chevak, AK 99563

Leslie Holland-Bartels
Center Director
Alaska Science Center
USGS
4230 University Drive
Anchorage, AK 99508

Wassillie Bavilla, President
Native Village of Kwinhagak
General Delivery
Quinhagak, AK 99655

Elizabeth A. Benson, AICP

Bristol Environmental & Engineering Services Corporation
111 West 16th Avenue, Suite 301
Anchorage, Alaska 99502-1117

Samuel Bergeron, President
Ketchikan Indian Community
2960 Tongass Avenue
Ketchikan, AK 99901

Henri Bisson
Alaska State Director
Bureau of Land Management
222 W Seventh Avenue, #13
Anchorage, Alaska 99513

Marcia Blaszak
Alaska Regional Director
National Park Service
240 West 5th Avenue, Room 114
Anchorage Alaska, 99501

Dave Boisseau
P.O. Box 920608
Dutch Harbor, AK 99692

Judith Brady
Alaska Oil and Gas (AOGA)
121 W. Fireweed Lane, Suite 207
Anchorage, AK 99503-2035

Dennis Bschor
Forest Service Alaska Regional Office
USDA Forest Service
PO Box 21628
Juneau, AK 99802-1628

Bruce Buzby, Manager
Coal Regulatory Program
Land and Water Coal Regulatory Program
Office of Surface Mining
U.S. Department of Interior
550 West 7th Avenue, Suite 900D
Anchorage, AK 99501-3577

Marlene Campbell

Coastal Management Coordinator
City and Borough of Sitka
100 Lincoln Street
Sitka, AK 99835

Postmaster Keith Coleman
United States Postal Service
Fairbanks PCC
5400 Mail Trail
Fairbanks, AK 99709-9998

COMMANDER
SEVENTEENTH COAST GUARD DISTRICT
P. O. Box 25517
Juneau, AK 99802-5517

John S. Devens, Ph.D.
P W S Regional Citizens' Advisory Board
3709 Spenard Road
Anchorage, AK 99503

Julie Dirks
P.O. Box 894
Unalaska, AK 99685

Steven A. Frenzel
Water Office Chief
Alaska Water Science Center
USGS
4230 University Dr., Suite 201
Anchorage, AK 99508-4664

James F. Fulton, Chief
Denver Field Division
Western Regional Coordinating Center
Office of Surface Mining
U.S. Department of Interior
P. O. Box 46667
Denver, CO 80201-4667

Col. Timothy J. Gallagher
Commander and District Engineer
U.S. Army Engineering District - Alaska

P.O. Box 6898
Anchorage, Alaska 99506-0898

Joy Geiselman
Deputy Office Chief
Biological Science Office
Alaska Science Center
1011 E. Tudor Rod., MS701
Anchorage, AK 99503

John Goll
Regional Director
U.S. Mineral Management Service
Alaska OCS Regional Office
3801 Centerpoint Drive, Suite 500
Anchorage, Alaska 99503-5820

Rowan Gould
Regional Director
U.S. Fish & Wildlife Service
Alaska Regional Office
1011 East Tudor
Anchorage, AK 99503

Glenn Gray
P.O. Box 33646
Juneau, AK 99803

Hal Gray
P.O. Box 27
Unalaska, AK 99685

Julie Hammonds
3535 W. Monte Cristo #127A
Phoenix, AZ 85053

Sandy Harbanuk
Coastal District Consultant
604 Fourth Street
Juneau, AK 99801

Peter Harley
900 E. Benson Blv.
Anchorage, AK 99508

Eileen Henniger
Wildlife Biologist
Yakatat Tlingit Tribe
P.O. Box 418
Yakutat, AK 99689

Hoonah Indian Association
P.O. Box 602
Hoonah, AK 99829

Byron K. Huffman
Division Manager
FAA Alaskan Region
Airports Division
222 W. 7th Avenue, #14
Anchorage, AK

David Johnston
Alaska Outer Continental Shelf Region
Minerals Management Service
USDOI
3801 Centerpoint Drive, Suite 500
Anchorage, AK 99503-5823

Representative Reggie Joule
AK State Legislature
State Capital Building
Juneau, AK 99803

Alice Julius
Native Village of Good News Bay
P.O. Box 138
Good News Bay, AK 99589

Frank Kelty
P.O. Box 162
Unalaska, AK 99685

Agrafina Kerr
P.O. Box 010
Nikolski, AK 99638

Postmaster Kerry Kimura

United States Postal Service
Greater Anchorage PCC
3720 Barrow St
Anchorage, AK 99599-9998

Karla Kolash
North Slope Borough
Office of the Mayor
P.O. Box 69
Barrow, AK 99723

Karol Kolehmainen
Aleutians West CRSA
P.O. Box 1074,
Palmer, AK 99645

KONIAG Incorporated
4300 B Street, Ste 407
Anchorage, AK 99503

Ron Kreizenbeck
Regional Administrator
U.S. EPA, Region 10
1200 Sixth Avenue
Seattle, WA 98101

Gabrielle LaRoche
555 Blue Sky Drive
Port Townsend WA 98368

Susan Lee, Planner I
Matanuska-Susitna Borough
350 E Dahlia Avenue
Palmer, AK 99645

David E. Leibersbach
Alaska Division of Emergency Services
P.O. Box 5750
Fort Richardson, Alaska 99505-5750
Lesnoi Village
P.O. Box 9009
Kodiak, AK 99615

Tom Lohman
North Slope Borough

4011 Winchester Loop
Anchorage, AK 99507

Bob Lohn
Regional Administrator
National Marine Fisheries Service (NOAA Fisheries)
7600 Sand Point Way NE
Seattle, WA 98115-0070

Leonty Lokanin
P.O. Box 47013
Atka, AK 99547

Hannah W. McCarty
Representative Beth Kerttula
Rm. 430, State Capitol
Juneau, AK 99801-1182

Michele Metz
Asst. Lands Manager
SEALASKA CORPORATION
One Sealaska Plaza, Suite 400
Juneau, AK 99801

Bosco Olsen, President
Native Village of Hooper Bay
P.O. Box 41
Hooper Bay, AK 99604

Senator Donald C. Olson
Alaska State Legislature, District 3
State Capital Building
Juneau, AK 99801-1182

John Oscar, Program Director
Cenaliulriit CRSA
P.O. Box 69
Mekaryuk, AK 99630

John Pennington
FEMA Regional Director
Region X
130 228th Street, SW
Bothell, WA 98021

Greg Peters
P.O. Box 431
Unalaska, AK 99685

Erin Reeve
Planner & Coastal District Coordinator
Ketchikan Gateway Borough
Department of Planning & Community Development
344 Front Street
Ketchikan, AK 99901

Ida Roehl, President
Native Village of Dillingham
P.O. Box 216
Dillingham, AK 99576

Sue Salveson
Assistant Regional Administrator
National Marine Fisheries Service (NMFS)
Alaska Region
PO Box 21668
Juneau, Alaska 99802-1668

Sari Saunders
4436 Wood Duck Avenue
Juneau, AK 99801

Gabriel Scott, Alaska Field Representative
Cascadia Wildlands Project
Alaska Field Office
P.O. Box 853
Cordova, AK 99574

Joshua Scott
AHTNA, Inc.
P.O. Box 649
Glenallen, AK 99588

Representative Paul Seaton
Alaska State Legislature
State Capital, Room 428
Juneau, AK 99802

Bob Shavelson
Cook-Inlet-Keeper

P.O. Box 3269
Homer, AK 99603

Dr. Donald F. Shepard
Village Administrator
Pedro Bay Village Council
P.O. Box 47020
Pedro Bay, AK 99647

Dave Sherman
SEACC
419 6th Street, Suite 200
Juneau, AK 99801

Carol Smith
Community and Economic Dev.
City of Valdez
P.O. Box 307
Valdez, AK 99686

Marv Smith
Community Development Coordinator
Lake and Peninsula Borough
P.O. Box 495
King Salmon, AK 99613

Faye Sullivan
Unocal
P.O. Box 196247
Anchorage, AK 99519-6247

Brian Templin
Craig City Planner
P.O. Box 725
Craig, AK 99921

Thede G. Tobish, Senior Planner
Municipality of Anchorage - Planning Dept.
P. O. Box 196650
Anchorage, AK 99519-6650

Marion Twitchell
Environmental Planner
Skagway Traditional Council
P.O. Box 1157

Skagway, AK 99840

U.S. EPA
Anchorage Office
222 West 7th Ave. #19
Anchorage, AK 99513-7588

U.S. EPA
Juneau Office
709 W 9th Street, Room 223A
PO Box 20370
Juneau, AK 99802-0370

U.S. EPA
Kenai Office
P.O. BOX 1329
Kenai, AK 99611

Joe Wehrman, AML Prog. Coordinator
Division of Mining, Land and Water
Office of Surface Mining
U.S. Department of Interior
550 West 7th Avenue, Suite 900D
Anchorage, AK 99501-3577

Lawrence Widmark, Jr., President
Sitka Trive of Alaska
456 Katlian Street
Sitka, AK 99835

Waslea Williams, Jr.
Box 69
Barrow, AK 99723

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Appendix D: Scoping Comments

15. BIBLIOGRAPHY

Air Quality. http://www.juneau.lib.ak.us/cdd/Kensington/airqual.htm Also: Effects on Wildlife. http://www.juneau.lib.ak.us/cdd/Kensington/wildlife.htm and Water Quality. http://www.juneau.lib.ak.us/cdd/Kensington/watrqual.htm

Alaska Department of Community and Economic Development, Division of Community and Business Development. November 2002. Alaska Economic Performance Report. http://www.commerce.state.ak.us/dca/pub/performancereport.pdf

Alaska Department of Environmental Conservation. May 2005. "EPA releases Toxic Release Inventory; DEC put it into perspective for Alaska." DEC News, May 11, 2005.

Alaska Department of Environmental Conservation. Alaska Regional Haze Fact Sheet. http://www.dec.state.ak.us/air/anpms/as/doc/RHfacts.pdf.

Alaska Department of Environmental Conservation. Alaska's SLAMS/NAMS Monitoring Network Assessment 2001 Annual Report. Air and Water Quality Division, Air and Water Data and Monitoring Section. Anchorage, Alaska.

Alaska Department of Fish and Game/Alaska Boards of Fisheries and Game. May 2002. Policy on Government-to-Government Relations with the Federally Recognized Tribes of Alaska.

Alaska Department of Fish and Game, Division of Commercial Fisheries. 2005. 2005 Overview of Division of Commercial Fisheries. Juneau, AK.

Alaska Department of Fish and Game. December 2003. Division of Subsistence Fisheries 2002 Annual Report. Juneau, Alaska.

Alaska Department of Fish and Game. Division of Subsistence Overview. http://www.subsistence.adfg.state.ak.us/geninfo/about/subgen.cfm

Alaska Department of Fish and Game, Division of Subsistence. 2000. Subsistence in Alaska: A Year 2000 Update. Juneau, Alaska.

Alaska Department of Fish and Game, Division of Wildlife Conservation. 2003. Alaska Wildlife Harvest Summary, 2002-2003.

Alaska Department of Fish and Game. Ecosystem Description: Species of Kachemak Bay.

Alaska Department of Fish and Game, Section of Boards Support. Alaska Boards

of Fisheries, Game and the Federal Subsistence Board/Alaska Board of Fisheries, Alaska Board of Game, and the Federal Subsistence Board.
http://www.boards.adfg.state.ak.us/bofgfsb/index.php

Alaska Department of Fish and Game. December 2000. "Species Used for Subsistence Purposes." Subsistence, Community Profile Database Technical Documentation, Section: Reference Tables.

Alaska Department of Fish and Game, Sport Fish Division. Economic Value of Sport Fishing in Alaska. http://www.sf.adfg.state.ak.us/statewide/SFeconomics.cfm.

Alaska Department of Fish and Game. Turtle.
http://www.adfg.state.ak.us/pubs/notebook/amphibia/turtle.php

Alaska Department of Natural Resources, Divison of Forestry. Alaska Forest Resources and Practices Act, Effective September 1, 2003 (booklet).
http://www.dnr.state.ak.us/forestry/forestpractices.htm

Alaska Department of Natural Resources, Division of Forestry. June 2004. Alaska Forest Resources and Practices Regulations. (booklet)

Alaska Department of Natural Resources, Divisoin of Geological and Geophysical Surveys. 1993. Alaska's High-Rank Coals. Fairbanks, AK.

Alaska Department of Natural Resources, Division of Mining. Alaska Hydrologic Survey. http://www.dnr.state.ak.us/mlw/water/hydro.

Alaska Department of Natural Resources Division of Mining, Land and Water. March 2004. Fact Sheet: Federal Permitts Required for your Mining Activities.

Alaska Department of Natural Resources, Division of Mining, Land and Water. March 2000. Fact Sheet: Land Ownership in Alaska.
http://www.dnr.state.ak.us/mlw/factsht/land_own.pdf

Alaska Department of Natural Resources, Division of Mining, Land and Water. Mining Laws and Regulations, as Contained in the Alaska Statutes and Alaska Administrative Code. August 2004.

Alaska Department of Natural Resources, Division of Oil and Gas. December 2004. Alaska Oil and Gas Report. Anchorage, AK. http://www.dog.dnr.state.ak.us

Alaska Department of Natural Resources Office of Habitat Management and Permitting. Title 41 (Fish Habitat) Permits. http://www.dnr.state.ak.us/habitat

/FHpermits.htm

Alaska Department of Natural Resources. 1985. Oil-And-Gas Resources of Alaska. Information Circular 31, Division of Geological and Geophysical Surveys.

Alaska Division of Wildlife Conservation. Overview. http://www.wildlife.alaska.gov/division_info/overview.cfm

Alaska National Interest Lands Conservation Act, 16 USC Chapter 51, 01/26/98

Alaska Native Policy Center. July 2004. Our Choices, Our Future: Analysis of the Status of Alaska Natives Report 2004. Anchorage, Alaska.

Alaska Natives Commission. The Alaska Natives Commission's Final Report. http://www.alaskool.org/resources/anc3/ANCIII.htm

Alaska's Final 2002/2003 Integrated Water Quality Monitoring Assessment Report. December 2003.

Alaska's Non-Endangered Species. http://www.wildlife.alaska.gov/aawildlife/endangered.

Alaskool. Alaska Regional Profiles. (Northwest Region, Yukon Region, Southeast Region, Southcentral Region). http://www.alaskool.org

ANILCA Introduction. http://www.r7.fws.gov/asm/anilca/intro.html

ANILCA Title VIII. Subsistence Management and Use Findings. http://www.r7.fws.gov/asm/anilca/title08.html

Audubon Watch List. (Short-tailed Albatross, Spectacled Eider, Steller's Eider). http://audubon2.org/webapp/watchlist/viewSpecies.jsp?id=188, **http://audubon2.org/webapp/watchlist/viewSpecies.jsp?id=193.** http://audubon2.org/webapp/watchlist/viewSpecies.jsp?id=197

Avalon Development Corporation. September 2002. Summary Report for the Duke Island CU-NI-PGE Property, Ketchikan Mining District, Alaska. Fairbanks, AK.

Bodkin, James and Monson, Daniel. Sea Otter Population Structur and Ecology in Alaska. Alaska Science Center, Anchorage, Alaska.

Bowker, J. M. Outdoor Recreation Participation and use by Alaskans: Projections 2000-2020. Athens, Georgia.

Brooks, David J. and Haynes, Richard W. Recreation and Tourism in South Central Alaska: Synthesis of Recent Trends and Prospects. Portland, Oregon.

Cannon, Jack. July 2003. "Census Data on Race." Alaska Economic Trends.

Cannon, Jack. June 2004. "Housing Trends." Alaska Economic Trends.

Chronology of Subsistence Management in Alaska. http://alaska.fws.gov/asm/shared/chron.htm

Colt, Steve. January 2001. The Economic Importance of Healthy Alaska Ecosystems. Institute of Social and Economic Research, University of Alaska, Anchorage. Anchorage, Alaska.

Environmental Health Perspectives. February 1998. Northern Overexposure. Vol. 106, Number 2, February 1998. http://ehp.niehs.nih.gov/qa106-2focus/focus.html

Exponent. August 2001. History and Environmental Impacts of DeLong Mountain Transportation System Port Site, Red Dog Operations, Alaska (Executive Summary)

Federal, State Subsistence Comparison. http://www.subsistmgtinfo.org/foscht.htm.

Federal Subsistence Management Program. http://alaska.fws.gov/asm/who.cfm

Ford, Jesse, Ph.D. and Hasselbach, Linda. May 2001. Heavy Metals in Mosses and Soils on Six Transects Along the Red Dog Mine Haul Road, Alaska, Western Arctic National Parklands, National Park Service. http://arcticcircule.uconn.edu/SEEJ/RedDog/execsummary.htm

Fried, Neal, and Windisch-Cole, Brigitta. September 2003. "The Oil Industry." Alaska Economic Trends.

Fried, Neal. February 2005. "Seventeen Years of Employment Growth." Alaska Economic Trends.

Fried, Neal. January 2005. "Transportation." Alaska Economic Trends. Vol. 25, No. 1. January, 2005.

Fried, Neal. August 2003. "The Trends 100; Alaska's largest private employers in 2002." Alaska Economic Trends. August, 2003.

Fried, Neal, Windisch-Cole, Brigitta and Keith, Brynn. November 2003.

"Alaska's Construction Industry." Alaska Economic Trends. November 2003.

Gilbertson, Neal, and Robinson, Dan. December 2003. "Natural Resources." Alaska Economic Trends, December, 2003.

Goldsmith, Scott, Angvik, Jane, Howe, Land, Hill, Alexandra and Leask, Linda. 2004. Status of Alaska Natives Report 2004.

Goldsmith, Scott and Killorin, Mary. January 2004. 2004 Alaska Construction Spending Forecast. Institute of Social and Economic Research, University of Alaska Anchorage. Anchorage, Alaska, January, 2004.

Goldsmith, Scott. October 2001. Economic Projections for Alaska and the Southern Railbelt; 2000 – 2005. Institute of Social and Economic Research, University of Alaska Anchorage. Anchorage, Alaska.

Greens Creek Mine. http://www.kennecottminerals.com/S&E_2003/GreensCreekMine2003.pdf

Hadland, Jeff and Cannon, Jack. September 2004. "Ten-Year Industry Forecast." Alaska Economic Trends, September, 2004

Haley, Sharman, Berman, Matthew, Goldsmith, Scott, Hill, Alexandra, and Hongjin, Kim. December 1999. Executive Summary: Economics of Sport Fishing in Alaska. Institute of Social and Economic Research, University of Alaska, Anchorage. Anchorage, Alaska.

Hatch, Scott A. and Piatt, John F. Seabirds in Alaska. http://biology.usgs.gov/s+t/noframe/b023/htm

The Institute of Social and Economic Research. May 2004. Executive Summary: Status of Alaska Natives 2004. University of Alaska Anchorage.

The Institute of Social and Economic Research. July 2000. Traditional Knowledge and Contaminants Project: Progress Report. University of Alaska Anchorage in Collaboration with the Alaska Native Science Commission.

Kruse, Gordon H., Funk, Fritz C., Geiger, Harold J., Mabry, Kristin R., Savikko, Herman M., and Siddeek, Shareef M. October 2000. Overview of State-Managed Marine Fisheries in the Central and Western Gulf of Alaska, Aleutian Islands, and Southeastern Bering Sea, with Reference to Steller Sea Lions. Regional Information Report 5J00-10, Alaska Department of Fish and Game, Division of Commercial Fisheries, Juneau, Alaska.

Larson, Eric. December, 1998. An Overview of Alaska's Natural Assets.

Institute of Social and Economic Research, University of Alaska Anchorage. Anchorage, AK.

Leask, Linda, Killorin, Mary, and Martin, Stephanie. October 2001. Trends in Alaska's People and Economy. Prepared for the Alaska 20/20 Partnership Bringing Alaskans Together to Chart our Future.

Lonner, Thomas D. Perceptions of Subsistence and Public Policy Formation in Alaska. Technical Paper Number 68. Alaska Department of Fish and Game, Division of Subsistence, Anchorage, Alaska.

Marine Advisory Program. Fisheries. http://www.uaf.edu/map/fisheries/index.html.

Meehan, Rosa, Byrd, Vernon, Divoky, George and Piatt, John. October 1998. Implications of Climate Change for Alaska's Seabirds. http://www.besis.uaf.edu/besis-oct98-report/Seabirds.pdf.

Memorandum of Understanding between the State of Alaska and USDA Forest Service on Coastal Zone Management Act/Alaska Coastal Management Program Consistency Reviews. FS Agreement No. 00MOU-111001-026.

Natcher, David, Haley, Sharman, Kofinas, Gary, and Parker, Walt. June 2003. Effective Local Institutions for Collective Action in Arctic Communities, Workshop Summary. A Workshop Supported by the National Science Foundation Arctic Social Sciences Program.

NMFS. 2005. Final Environmental Impact Statement for Essential Fish Habitat Identification and Conservation in Alaska .

NMFS. Incidental Take (Bycatch) of Seabirds. http://www.fakr.noaa.gov/protectedresources/seabirds/bycatchinfo.htm.

NMFS. 1999. Our Living Oceans. Report on the Status of U.S. living marine resources, 1999. U.S. Department of Commerce, NOAA Technical Memo. NMFS-F/SPO-41, on-line version, http://spo.nwr.noaa.gov/olo99.htm.

NOAA. 2003. Alaska Marine Mammal Stock Assessments for: Bowhead Whale, Fin Whale, Minke Whale, Stejneger's Beaked Whale, Blue Whale, Cuvier's Beaked Whale, Beluga Whale, Baird's Beaked Whale, Sperm Whale, North Pacific Right Whale, Humpback Whale, Beluga Whale, Dall's Porpoise, Harbor Porpoise, Pacific Walrus, Polar Bear, Sea Otter, and Steller Sea Lion.

http://www.nmfs.noaa.gov/pr/PR2/Stock_Assessment_Program/sars.html.

Nobmann, Elisabeth, Ph.D. September 1997. Nutritional Benefits of Subsistence Food. Anchorage, Alaska.

NovaGold Resources, Inc. Projects. http://www.novagold.net/s/NomeProjects.asp

O'Brien, Michael. November 13, 2001 "Alaska Natives and Environmentalists Battle Injustice At Red Dog," Vermont Journal of the Environment.

Office of the Governor, Division of Governmental Coordination. Guidebook 1: Introduction to the Alaska Coastal Management Program; What it is and how it works.

Office of the Governor, Division of Government Coordination. Guidebook 4: Special Area Planning.

Olson, Paul and Keith, Brynn. October 2004. "Ten-Year Occupational Forecast." Alaska Economic Trends. Vol. 24, No. 10, October 2004.

Power, Thomas M. February 2002. The Role of Metal Mining in the Alaskan Economy. A report prepared for the Southeast Alaska Conservation Council Northern Alaska Environmental Center.

Schaff, Ross G. September 1983. Coal Resources of Alaska. Information Circular 17. Department of Natural Resources, Division of Geological and Geophysical Surveys.

State Coal Profile: Alaska. www.eia.doe.gov/cneaf/**coal**/st_**coal**_pdf/0576e.pdf.

Stephensen, Shawn W. and Irons, David B. September 2003. "Comparison of Colonial Breeding Seabirds in the Eastern Bering Sea and Gulf of Alaska," Marine Ornithology, Vol. 31, 167-173.

Szumigala, D. J. and Hughes, R.A. March 2005. Alaska's Mineral Industry 2004: A Summary. Information Circular 51, Division of Geological and Geophysical Surveys.

Tongass National Forest. Forest Facts: Fact Sheet – Final Rule, Amending the Roadless Area Conservation Rule for the Tongass National Forest. http://www.fs.fed.us/r10/tongass/forest_facts/resources/forest/roadless.html.

U.S. Army Corps of Engineers. Press Release: "Army Corps of Engineers

Regulatory Program plays a major role in the use of Alaska's Wetlands." Setpember 8, 2000. http://www.hq.usace.army.mil/cepa/releases/Alaska.htm

U.S. Department of the Interior. April 1987. Arctic National Wildlife Refuge, Alaska; Coastal Plain Resource Assessment.

U.S. Department of the Interior. 1995. Biologue Series: Muskoxen in the Arctic National Wildlife Refuge.

U.S. Department of the Interior. November 2005. FEIS: Renewal of the Federal Grant for the Trans-Alaska Pipeline System Right-of-Way.

U.S. Department of the Interior. The Impact of Federal Programs on Wetlands. http://www.doi.gov/oepc/wetlands2/v2ch13.html (also chapter 14)

U.S. Department of the Interior. January 2005. Significant Events, Trends, and Issues. U.S. Geological Survey, Washington, D.C.

U.S. Environmental Protection Agency. 2003. The Particle Pollution Report; Current Understanding of Air Quality and Emissions through 2003. Research Triangle Park, North Carolina.

U.S. Environmental Protection Agency. December 2003. Tribal Needs Letter & Notes. EPA 910-R-01-003, Region 10, Seattle, WA.

U.S. Environmental Protection Agency, Department of the Army, U.S. Fish and Wildlife Service, National Marine Fisheries Service (NOAA). May 1994. Alaska Wetlands Initiative; Summary Report.

U.S. Fish and Wildlife Service – Alaska. Fact Sheets: Polar Bear, Walrus: http://alaska.fws.gov/fisheries/mmm/polarbear/pbmain.htm, http://alaska.fws.gov/fisheries/mmm/walrus/nhistory.htm

U.S. Fish and Wildlife Service News Release: "Federal Subsistence Board Begins Review of Rural/Nonrural Status of Alaska Communities." January 31, 2005. http://alaska/fws.gov/asm/newsrel/r013105.html.

U.S. Geological Survey. Alaska Biological Center. Research Program (Birds). http://www.absc.usgs.gov/research/programs/birds.htm.

U.S. Geological Survey. April 2001. Arctic National Wildlife Refuge, 1002 Area, Petroleum Assessment, 1998, Including Economic Analysis. USGS Fact Sheet FS-028-01.

U.S. Geological Survey. Eskimo Curlew; A Vanishing Species? Northern Prairie

Wildlife Research Center. http://www.npwrc.usgs.gov/resource/birds/curlew/curlew.htm

U.S. Geological Survey. March 2001. The National Petroleum Reserve—Alaska (NPRA) Data Archive. USGS Fact Sheet FS-024-01.

U.S. Geological Survey. 2005. Oil and Gas Assessment of Central North Slope, Alaska, 2005. National Assessment of Oil and Gas Fact Sheet, U.S. Geological Survey Fact Sheet 2005-3043, Version 1.1, 2005. http://pubx.usgs.gov/fs/2005/3043.

U.S. Geological Survey. 2002 U.S. Geological Survey 2002 Petroleum Resource Assessment of the National Petroleum Reserve in Alaska. U.S. Geological Survey Fact Sheet 045-02. http://geopubs.wr.usgs.gov/fact-sheet/fs045-02.

U.S. Geological Survey. May 2002. "USGS Revised Estimates of Undiscovered Oil and Gas Resources in NPRA," News Release. Reston, Virginia. May 16, 2002. http://www.usgs.gov/public/press/public_affairs/press_rel.

Westerners for Responsible Mining. Hardrock Mining in Alaska. http://www.bettermines.org/reddog.cfm.

Westerners for Responsible Mining. Red Dog Zinc Mine, Alaska. http://www.bettermines.org/reddog.cfm

Wiita, Amy. The Alaska Wood Products Industry in 2001. Institute of Social and Eocnomic Research, University of Alaska Anchorage. Anchorage, Alaska.

Williams, J. Gregory. March 2004. "Population." Alaska Economic Trends.

Williams, J. Gregory. February 2005. "Population Projections: Projections for Alaska Population 2005—2009." Alaska Economic Trends.

Williamson McDiarmid, G., Goldsmith, Scott, Killorin, Mary and Sharp, Suzanne. November 1988. Expanding Job Opportunities for Alaska Natives. http://www.iser.uaa.alaska.edu/publications/client/afnjobs/afnjobs.htm

Wolfe, Robert. Frequently Asked Questions; Myths: What Have You Heard?. Alaska Department of Fish and Game, Division of Subsistence. http://www.subsistence.adfg.state.ak.us

Wolfe, Robert J. and Utermohle, Charles J. June 2000. Wild Food Consumption Rate Estimates for Rural Alaska Populations. Technical Paper No. 21, Alaska Department of Fish and Game, Division of Subsistence, Juneau Alaska.

Wolfe, Robert J. and Walker, Robert J. 1987. Subsistence Economies in Alaska: Productivity, Geography, and Development Impacts. Arctic Anthropology, Vol. 24, No.

2, pp. 56-81, 1987.

Wolfe, Robert J. Wild Food Harvests in Alaska, Nutritional Contributions Sorted by Harvest and by Place. Division of Subsistence, Alaska Department of Fish and Game.

Wolfe, Robert J., Ph.D. August 1996. Subsistence Food Harvests in Rural Alaska and Food Safety Issues. (Paper presented to the Institute of Medicine, National Academy of Sciences Committee on Environmental Justice, Spokane, Washington.

A copy of your comments should also be submitted to me by mail at NOAA Strategic Planning Office (PPI/SP), SSMC3, Rm. 15603, 1315 East-West Highway, Silver Spring, Maryland, 10910; by fax to 301-713-0585; or by e-mail to nepa.comments @noaa.gov.

Sincerely,

Susan A. Kennedy
Acting NEPA Coordinator

Enclosure